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NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/8 13/13  
NATIONAL DAM SAFETY PROGRAM. OGUAGA CREEK STATE PARK DAM (INVEN--ETC(U)  
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.  The examination of documents and visual inspection of the Oquaga Creek State Park Dam did not reveal conditions which constitute a hazard to human life or property.		

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The hydrologic/hydraulic analyses performed indicate that the outflows from the Probable Maximum Flood (PMF) will result in the dam being overtopped. The outflows from one-half the PMF will not result in the dam being overtopped. Therefore, the spillway capacity is rated as inadequate.

The deficiencies noted on this structure were of a minor nature. One action which should be taken is to extend the collector pipe of the interceptor drain beneath the auxiliary spillway. In addition, an emergency action plan for notification of downstream residents should be developed for this structure. These actions should be taken within 6 months of the date of notification of the owner.

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## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
OQUAGA CREEK STATE PARK DAM  
I.D. NO. NY 783  
DELAWARE RIVER BASIN  
BROOME COUNTY, NEW YORK

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PHASE I REPORT  
NATIONAL DAM SAFETY PROGRAM

Name of Dam: Oquaga Creek State Park Dam  
I.D. No. NY 783

State Located: New York

County Located: Broome

Watershed: Delaware River Basin

Stream: Oquaga Creek

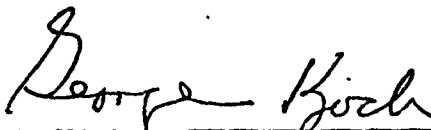
Date of Inspection: November 7, 1979

ASSESSMENT

The examination of documents and visual inspection of the Oquaga Creek State Park Dam did not reveal conditions which constitute a hazard to human life or property.

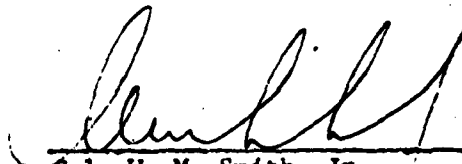
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The deficiencies noted on this structure were of a minor nature. One action which should be taken is to extend the collector pipe of the interceptor drain beneath the auxiliary spillway. In addition, an emergency action plan for notification of downstream residents should be developed for this structure. These actions should be taken within 6 months of the date of notification of the owner.



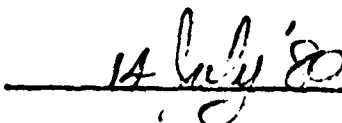
George Koch  
Chief, Dam Safety Section  
New York State Department  
of Environmental Conservation  
NY License No. 45937

Approved By:



Col. W. M. Smith, Jr.  
New York District Engineer

Date:







OVERVIEW  
OQUAGA CREEK STATE PARK DAM  
I.D. No. NY 783

⑩ George Koch | ⑪ 14 11 24  
⑫ 117 | ⑬ DACW 52-79-C-0001

⑭ PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
OQUAGA CREEK STATE PARK DAM (Inventory New York N.Y. 783)  
I.D. No. NY-783  
11/13/79  
DELAWARE RIVER BASIN  
BROOME COUNTY, NEW YORK  
Phase I Inspection  
[Signature]

## SECTION 1: PROJECT INFORMATION

### 1.1 GENERAL

#### a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

#### b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

### 1.2 DESCRIPTION OF PROJECT

#### a. Description of Dam

The Oquaga Creek State Park Dam consists of an earth dam with a principal spillway pipe passing through the embankment and an excavated auxiliary spillway channel at the southern abutment.

The dam consists of a compacted, earth embankment with riprap on the upstream slope and a toe drain at the base of the downstream slope. The embankment is 54 feet high, has a crest length of 370 feet, and a crest width of 18 feet. The upstream slope is 1 vertical on 3 horizontal with a 10 foot wide berm near the midpoint of the slope. The downstream slope is a 1 vertical on 2.5 horizontal. The crest and exposed slopes are grass covered. An earth cutoff trench, which is a minimum of 10 feet deep and has a base width of 10 feet, keys the embankment into the foundation soils. There is a drainage blanket beneath the embankment on the south abutment slope.

The principal spillway consists of a rectangular reinforced concrete drop inlet structure, a 48 inch reinforced concrete pressure pipe with anti-seepage collars and a plunge pool to dissipate energy at the outlet end of the conduit. A reservoir drain consisting of a 24 inch steel pipe extends from the upstream toe of the embankment at the base of the principal spillway riser. An 18 inch vertical slide gate mechanism controls flow through the reservoir drain. The grass covered auxiliary spillway is in an earth cut and has a base width of 60 feet. A rock fill drain extends beneath the auxiliary spillway channel to intercept flow coming off the hillside. A collector pipe within the fill carries water to a point on the south abutment slope beyond the toe of the dam.

392 770

[Signature]

b. Location

The Oquaga Creek State Park Dam is located on Oquaga Creek approximately 3/4 mile southwest of the village of Arctic. The dam is on North Sanford Road in the town of Sanford, New York.

c. Size Classification

The dam is 54 feet high and has a maximum storage capacity of 1601 acre feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The dam is classified as "high" hazard due to the presence of five houses and several town roads downstream of the dam.

e. Ownership

The dam is owned by New York State Office of Parks and Recreation. Mr. Jack Barkevich, Associate Park Engineer, was contacted concerning the inspection. His address is Empire State Plaza, Agency Building No. 1, Albany, New York 12238. His phone number is (518)474-0482.

f. Purpose of Dam

The dam was constructed to provide a lake for recreational purposes at the state park.

g. Design and Construction History

This dam was designed by the New York State Office of General Services in 1972. It was constructed in 1974-76 by the A.J. Cerasaro Construction Company of Endicott, New York.

h. Normal Operating Procedures

Normal flows are discharged through the principal spillway. Outflows from large storms will result in discharge through the auxiliary spillway as well.

1.3 PERTINENT DATA

a. Drainage Area (acres)	2833
b. Discharge at Dam (cfs)	
Principal spillway at maximum high water	382
Principal spillway at auxiliary spillway crest elevation	351
Auxiliary spillway at maximum high water	4272
Reservoir drain at principal spillway crest elevation	101
c. Elevation (USGS Datum)	
Top of dam	1586.0
Auxiliary spillway crest	1578.5
Principal spillway crest	1573.0
Reservoir drain, invert elevation	1535.02

d. Reservoir-Surface Area (acres)

Top of dam	104
Auxiliary spillway crest	87
Principal spillway crest	66

e. Storage Capacity (acre-feet)

Top of dam	1601
Auxiliary spillway crest	1117
Principal spillway crest	727

f. Dam

Embankment type - Compacted earth fill with riprap on upstream face and a toe drain at downstream toe. Keyed cutoff trench is beneath entire embankment.

Embankment length (ft)	370
Slopes - Upstream	1 vertical on 3 horizontal
Downstream	1 vertical on 2.5 horizontal
Crest width (ft)	18

g. Principal Spillway

Type: Ungated, reinforced concrete drop inlet (27.83 x 14 ft) rising 33.5 feet above the invert of the 48 inch diameter concrete conduit 224 feet long; riprapped plunge pool.

Weir length (ft)	24.66
------------------	-------

h. Auxiliary Spillway

Type: Channel cut into earth with trapezoidal cross section

Bottom width (ft)	60
Side slopes (V:H)	1 on 2.5

i. Reservoir Drain

Type: 24 inch diameter steel pipe with a reinforced concrete inlet.

Control: Manually operated vertical slide gate 18 inches in diameter - control located on top of riser.

## SECTION 2: ENGINEERING DATA

### 2.1 GEOTECHNICAL DATA

#### a. Geology

The Oquaga Creek State Park Dam is located in the glaciated portion of the Appalachian uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by dissection of the uplifted but flat lying sandstones and shales of the Middle and Upper Devonian Catskill Delta.

Glacial cover is generally thin, although some north south valleys are so thick that they are completely buried. The present surficial deposits have resulted primarily from glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

#### b. Subsurface Investigations

A subsurface investigation program was conducted in 1971 by the Soil Mechanics Bureau of the New York State Department of Transportation and by the Onondaga Soil Testing Company as a part of the design process. This program consisted of 14 test pits, 21 probe holes and over 75 drill holes. Holes were progressed both at the dam site and in the proposed borrow areas. Several sample logs from drill holes progressed into the dam's foundation soils have been included in Appendix D.

The soils in the vicinity of the dam are generally sands and gravels. These soils are underlain by sandstone and shale at depths ranging from 5 to 25 feet. Rock outcrops were also encountered on the valley walls.

### 2.2 DESIGN RECORDS

The dam was designed by the New York State Office of General Services (OGS). Technical assistance regarding the soils related aspects of the design was provided to OGS by the Soil Mechanics Bureau of the Department of Transportation. The design records for this structure are available from the Design and Construction Section of OGS. Several sheets from the plans for the structure have been included in Appendix F.

### 2.3 CONSTRUCTION RECORDS

Construction records are available from OGS. Several changes from the original design were made during the construction. The most substantial changes were the inclusion of a drainage blanket under the embankment on the south abutment slope and the change to a rock lined plunge pool rather than the concrete lining specified on the plans.

### 2.4 OPERATION RECORDS

No regular water level records are kept for this structure.

## 2.5 EVALUATION OF DATA

The data presented in this report has been compiled from information obtained from the Office of Parks and Recreation, Office of General Services, and the Department of Environmental Conservation files. It appears to be adequate and reliable for Phase I inspection purposes.

### SECTION 3: VISUAL INSPECTION

#### 3.1 FINDINGS

##### a. General

Visual inspection of the Oquaga Lake State Park Dam was conducted on November 7, 1979. The weather was overcast with occasional showers and the temperature was in the forties. The water surface at the time of inspection was approximately 9 inches above the principal spillway crest.

##### b. Embankment

No signs of distress were observed in the earth embankment, and no evidence of misalignment, subsidence, surface cracking, sloughing, or seepage were noted on the embankment. The vegetative cover on the embankment was satisfactory. Vehicle wheel paths had been worn into the crest but they were of a minor nature. The collector pipe carrying discharge from the drainage blanket placed on the south abutment of the dam was discharging at a rate of about 15 gallons per minute. The end of this pipe was broken, with a piece missing.

##### c. Principal Spillway

The principal spillway riser, the pipe and the plunge pool were in satisfactory condition. The final few sections of the pipe were set on a slight curve so the pipe would outlet in the center of the existing stream channel. Aluminum bands had been placed around the pipe joints to protect the joint sealing material.

##### d. Auxiliary Spillway

The grassed earth, auxiliary spillway channel appeared to be in satisfactory condition. A rockfill drain with a perforated collector pipe was installed during construction beneath the auxiliary spillway channel to intercept seepage coming off the hillside. The outlet to the collector pipe is on the south abutment slope beyond the downstream toe of the embankment slope. The water flows down the hillside beyond the abutment and into the channel in the vicinity of the plunge pool. A minor amount of ponding was also noted in the invert of the spillway channel.

##### e. Reservoir Drain

The reservoir drain and manually operated slide gate may be used to lower the reservoir level. This system was reported to be operational. There is a 2 inch diameter hole in the reservoir drain gate which allows a continuous cold water withdrawal from the lake for the fish in the downstream channel.

##### f. Downstream Channel

The downstream channel beyond the plunge pool is the natural stream channel. There were trees growing along the edge of the channel, but it did not appear that they would impede flow in the channel.

##### g. Reservoir

There were no signs of soil instability in the reservoir area.

### 3.2 EVALUATION OF OBSERVATIONS

Visual observations did not reveal any problems which would adversely affect the safety of the dam. The collector pipe from the interceptor drain beneath the auxiliary spillway should be extended to carry the water which now flows down the south abutment slope to a point well beyond the plunge pool.



#### SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

##### 4.1 PROCEDURES

The normal water surface elevation is approximately at the crest of the principal spillway. Downstream flows are limited by the capacity of the 48 inch diameter reinforced concrete pipe, except during periods of extremely heavy runoff when the auxiliary spillway is in service.

##### 4.2 MAINTENANCE OF THE DAM

The dam is maintained by the owner. The maintenance on this dam is generally satisfactory.

##### 4.3 WARNING SYSTEM IN EFFECT

There is no warning system in effect.

##### 4.4 EVALUATION

The operation and maintenance procedures for this structure are satisfactory.

## SECTION 5: HYDROLOGIC/HYDRAULIC

### 5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed of the Oquaga Creek State Park Dam was made using the USGS 7.5 minute quadrangle for North Sanford, New York. The drainage area is 2833 acres and consists of open grassed fields and woodlands. Relief in the drainage area ranges from moderate to steep.

### 5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineers HEC-1 computer program. Dam Safety version. This program develops an inflow hydrograph using the "Snyder Synthetic Unit Hydrograph" method and then uses the "Modified Puls" flood routing procedure. The spillway design flood selected was the Probable Maximum Flood (PMF) in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers.

### 5.3 SPILLWAY CAPACITY

The principal and auxiliary spillway are ungated structures. The principal spillway operates under weir or orifice flow conditions depending on the level of the reservoir pool. During orifice flow operation, pressure flow develops in the 48 inch conduit. The auxiliary spillway was analyzed as a broad-crested weir having a discharge coefficient (c) of 2.6.

The spillways do not have sufficient capacity for discharging the peak outflow from the PMF. For this storm the peak inflow is 8679 cfs and the peak outflow is 8618 cfs. The total discharge capacity of both spillways with the water surface at the top of the dam is 4654 cfs.

The spillways have sufficient capacity for discharging the peak outflow from one half the PMF. For this storm, the peak inflow is 4339 cfs and the peak outflow is 3623 cfs. When the spillways are discharging the peak outflow from this storm, the water surface will be 1.8 feet below the top of the dam.

### 5.4 RESERVOIR CAPACITY

Normal flood control storage capacity of the reservoir between the principal and auxiliary spillways is 390 acre-feet, which is equivalent to a runoff depth of 1.6 inches over the drainage area. Surge storage capacity to the maximum high water elevation is an additional 484 acre-feet equivalent to a runoff depth of 2.0 inches over the drainage area. Total storage capacity of the dam is 1601 acre-feet.

### 5.5 FLOODS OF RECORD

The maximum known water level at this structure was estimated by park personnel to be approximately 1 foot above the principal spillway crest. The calculated discharge for this flood is as follows:

<u>Elevation (ft)</u>	<u>Discharge (cfs)</u>
1574	74

#### 5.6 OVERTOPPING POTENTIAL

Analysis indicates that the dam does not have sufficient spillway capacity to adequately discharge the outflows from the PMF. For a PMF peak outflow of 8618 cfs, the dam would be overtopped to a computed depth of 1.79 feet. However, the analysis indicates that the outflows from one-half the PMF will not result in the dam being overtopped. For a one half PMF peak outflow of 3623 cfs, the maximum water surface will be 1.8 feet below the top of the dam.

#### 5.7 EVALUATION

The dam does not have sufficient spillway capacity to pass the PMF. The outflows from one half the PMF will not cause the dam to be overtopped. Therefore, the spillway capacity of this dam is rated as inadequate.

## SECTION 6: STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observations

No signs of distress were observed in connection with the earth embankment. There was a substantial flow of water coming off the hillside to the north of the auxiliary spillway channel. This water was flowing far enough downstream of the toe so it did not appear to affect the stability of the dam.

#### b. Design and Construction Data

No information regarding the slope stability analysis for the design of this structure was available from the owner. A slope stability analysis for the earth embankment is beyond the scope of work for a Phase I report. However, the slopes are relatively flat and there was no evidence of any instability.

#### c. Seismic Stability

No seismic stability analysis was performed for this structure.

## SECTION 7: ASSESSMENT/RECOMMENDATIONS

### 7.1 ASSESSMENT

#### a. Safety

The Phase I inspection of the Oquaga Creek State Park Dam did not reveal conditions which constitute a hazard to human life or property. The earth embankment is considered to be stable. The dam does not have sufficient spillway capacity to discharge the outflows from the Probable Maximum Flood (PMF) without being overtopped. The spillways do have sufficient capacity to discharge the outflows from one half the PMF.

#### b. Adequacy of Information

Information reviewed for Phase I inspection purposes is considered to be adequate.

#### c. Need for Additional Investigations

No additional investigations are needed at this time.

### 7.2 RECOMMENDED MEASURES

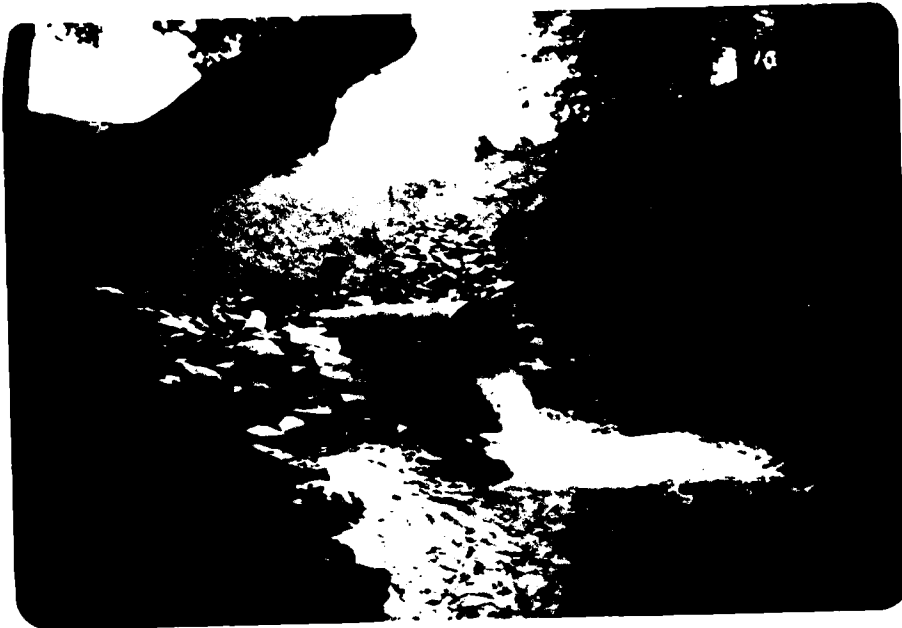
- a. Extend the collector pipe from the inteceptor drain beneath the auxiliary spillway channel to carry water well beyond the plunge pool.
- b. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including operation and lubrication of the gate mechanism. Document this information for future reference.
- c. Develop an emergency action plan for notification of downstream residents and the proper authorities in the event the dam is endangered.

APPENDIX A

PHOTOGRAPHS



Upstream Slope of Embankment



Downstream Toe of Embankment - Note Rock Toe Drain

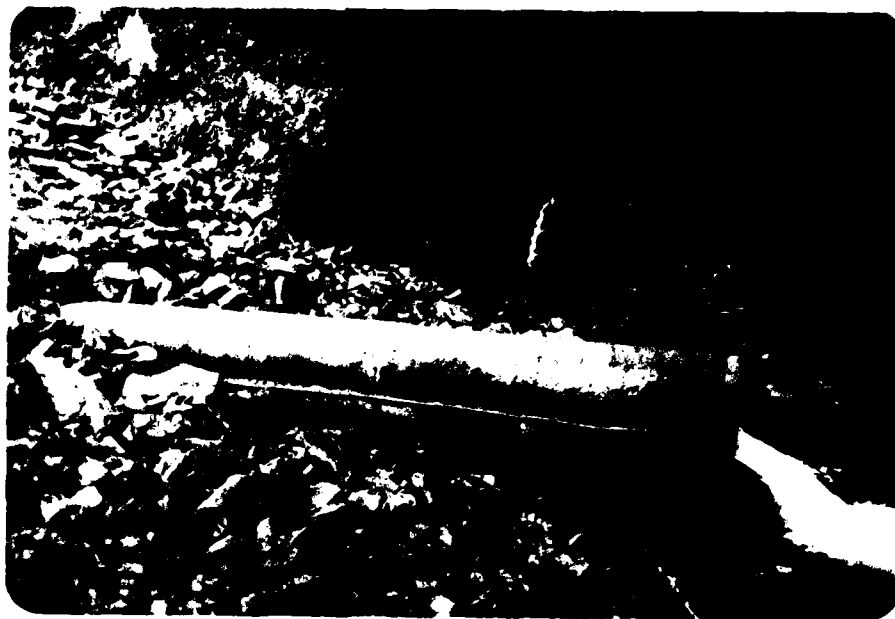


Principal Spillway Riser - Reservoir Drain Control on Roof of Riser



Auxiliary Spillway on Southern End of Dam





Outlet of Principal Spillway Pipe



Outlet to Collector Pipe from South Abutment Drainage Blanket



Outlet to Principal Spillway Conduit - Note Curve in Pipe



Aluminum Band Protecting Joint on Principal Spillway Pipe



South Abutment Slope - Auxiliary Spillway Channel Beyond Trees



Water Flowing Down South Abutment Slope From Drain Beneath Auxiliary Channel

APPENDIX B  
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam QUAGA CREEK STATE PARK DAM  
Fed. I.D. # 783 DEC Dam No. 119A-4360  
River Basin DELAWARE  
Location: Town SANFORD County BROOME  
Stream Name QUAGA CREEK  
Tributary of DELAWARE RIVER  
Latitude (N) 42° 10.7' Longitude (W) 75° 25.5'  
Type of Dam EARTH & ROCKFILL  
Hazard Category C  
Date(s) of Inspection 11/7/79  
Weather Conditions 40° RAIN  
Reservoir Level at Time of Inspection WATER AT 2½ CHANNELS UP FROM BOTTOM

b. Inspection Personnel W. LYNICK R. WARRENDER

c. Persons Contacted (Including Address & Phone No.)  
JEFF MC CLURE - OFFICE OF PARKS & RECREATION - JAMESVILLE  
PHONE - 315 - 473 - 8400  
ED MOSHER - OFFICE OF GENERAL SERVICES - EIC FOR PROJECT

d. History:

Date Constructed 1974-76 Date(s) Reconstructed \_\_\_\_\_  
Designer OGS & DOT  
Constructed By A.T. CERASARO - ENDICOT, N.Y.  
Owner NYS OFFICE OF PARKS & RECREATION

2) Embankment

a. Characteristics

- (1) Embankment Material \_\_\_\_\_  
\_\_\_\_\_  
(2) Cutoff Type COMPACTED EARTH  
\_\_\_\_\_  
(3) Impervious Core NONE  
\_\_\_\_\_  
(4) Internal Drainage System BLANKET INSTALLED ON SOUTH  
ABUTMENT UNDER EMBANKMENT  
(5) Miscellaneous \_\_\_\_\_  
\_\_\_\_\_

b. Crest

- (1) Vertical Alignment SATISFACTORY- POSITIVE CAMBER AT CENTER  
\_\_\_\_\_  
(2) Horizontal Alignment SATISFACTORY  
\_\_\_\_\_  
(3) Surface Cracks NONE  
\_\_\_\_\_  
(4) Miscellaneous VEHICLE WHEEL PATH ALONG CREST  
\_\_\_\_\_

c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1 ON 3  
(2) Undesirable Growth or Debris, Animal Burrows NONE - GRASS  
COVERED  
(3) Sloughing, Subsidence or Depressions NONE  
\_\_\_\_\_  
\_\_\_\_\_

(4) Slope Protection WELL GRADED HEAVY RIPRAP-SATISFACTORY

(5) Surface Cracks or Movement at Toe \_\_\_\_\_

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 ON 2 1/2

(2) Undesirable Growth or Debris, Animal Burrows NONE

(3) Sloughing, Subsidence or Depressions NONE

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage NONE

(6) External Drainage System (Ditches, Trenches; Blanket) ~~NONE~~  
TOE DRAIN AND RIPRAP AT ABUTMENT CONNECTIONS

(7) Condition Around Outlet Structure SATISFACTORY-HEAVY WELL  
GRADED RIPRAP

(8) Seepage Beyond Toe NONE

e. Abutments - Embankment Contact

HEAVY WELL GRADED RIPRAP

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE

3) Drainage System

a. Description of System BLANKET ON SOUTHERN ABUTMENT

b. Condition of System FUNCTIONAL

c. Discharge from Drainage System YES - ESTIMATED AT 15 GALLONS PER  
MINUTE OF CLEAN WATER

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs,  
Piezometers, Etc.)

NONE



5) Reservoir

a. Slopes GRASSED & TREED TO EDGE

b. Sedimentation NONE APPARENT

c. Unusual Conditions Which Affect Dam NONE

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) 5<sup>+</sup> HOUSES; TOWN ROAD TO NORTH SANFORD

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel NATURAL, BEDROCK; TREED TO EDGE IMMEDIATELY DOWNSTREAM OF DAM (NARROW CHANNEL) OPENS INTO FARM FIELD IN ABOUT 1/4 MILES

7) Spillway(s) (Including Discharge Conveyance Channel)

2 STAGE VERTICAL RISER W/ RCP CONDUIT - PRINCIPAL EARTH CUT AUXILIARY SPILLWAY

a. General SERVICE SPILLWAY KINKED FOR 2 EXPOSED SECTIONS - ALUMINUM SHEET STRIP WITH STEEL BAND TIE WAS ~~WAS~~ PROTECTING JOINTS - FRENCH DRAIN INSTALLED BENEATH AUX. SPILLWAY TO COLLECT HILLSIDE RUN OFF - CONSTRUCTION CHANGE

b. Condition of Service Spillway CONCRETE CRADLE - SATISFACTORY NO SEEPAGE COMING FROM PIPE/CRADLE DOWNSTREAM JOINT - INDICATES THAT PATCH AT JOINTS IS OKAY WITHIN CRADLE.

c. Condition of Auxiliary Spillway SATISFACTORY

HILLSIDE SEEPAGE KNOWN TO OCCUR IN AREA - IN EVIDENCE IN  
SUBSTANTIAL QUANTITY ENTERING DOWNSTREAM CHANNEL FROM PLUNGE POOL  
1/2 WAY BACK TOWARDS EMBANKMENT

SPILLWAY INVERT - ALSO HAVING PONDING IN EVIDENCE ALONG ENTIRE INVERT

d. Condition of Discharge Conveyance Channel NATURAL ROCK INVERT

SATISFACTORY

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit \_\_\_\_\_ Other \_\_\_\_\_

Material: Concrete ✓ Metal \_\_\_\_\_ Other \_\_\_\_\_

Size: 24 INCH - 18" GATE Length 65'

Invert Elevations: Entrance 1540.25 Exit 1539.5

Physical Condition (Describe): \_\_\_\_\_ Unobservable ✓

Material: \_\_\_\_\_

Joints: \_\_\_\_\_ Alignment \_\_\_\_\_

Structural Integrity: \_\_\_\_\_

Hydraulic Capability: \_\_\_\_\_

Means of Control: Gate ✓ 18" Valve \_\_\_\_\_ Uncontrolled \_\_\_\_\_

Operation: Operable ✓ Inoperable \_\_\_\_\_ Other \_\_\_\_\_

Present Condition (Describe): REPORTED TO BE OPERABLE

2" DIAMETER HOLE IN PLATE OF DRAIN - ALLOWS CONTINUOUS  
COLD H<sub>2</sub>O WITHDRAWAL FROM LAKE FOR DOWNSTREAM  
FISH.

9) Structural

- a. Concrete Surfaces SATISFACTORY
- b. Structural Cracking NONE APPARENT
- c. Movement - Horizontal & Vertical Alignment (Settlement) NONE
- d. Junctions with Abutments or Embankments.
- e. Drains - Foundation, Joint, Face BROKEN PIECE OF PIPE AT  
END OF DRAIN OUTLET PIPE
- f. Water Passages, Conduits, Sluices
- g. Seepage or Leakage NONE

h. Joints - Construction, etc. PRINCIPAL SPILLWAY PIPE JOINTS HAVE NEOPRENE  
SEALS - ALUM. SHEET W/ STEEL BAND COVERS JOINT, BAND IS  
PRIMARYLY USED TO KEEP DIRT OUT

i. Foundation

j. Abutments

k. Control Gates

l. Approach & Outlet Channels

m. Energy Dissipators (Plunge Pool, etc.) 1 1/2' - 2' DEEP IN NATURAL  
CHANNEL; ROCK LINED PLUNGE POOL

n. Intake Structures

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC  
ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS  
HYDROLOGIC AND HYDRAULIC  
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1586.0</u>	<u>104.4</u>	<u>1601</u>
2) Design High Water (Max. Design Pool)	<u>          </u>	<u>          </u>	<u>          </u>
3) Auxiliary Spillway Crest	<u>1578.5</u>	<u>87.0</u>	<u><del>1601</del> 1117</u>
4) Pool Level with Flashboards	<u>          </u>	<u>          </u>	<u>          </u>
5) Service Spillway Crest	<u>1573.0</u>	<u>66.1</u>	<u>727</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>          </u>
2) Spillway @ Maximum High Water	<u>382</u>
3) Spillway @ Design High Water	<u>          </u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>351</u>
5) Low Level Outlet	<u>101.2</u>
6) Total (of all facilities) @ Maximum High Water	<u>4654</u>
7) Maximum Known Flood	<u>74</u>

## CREST:

ELEVATION: 1586Type: GRASSED EARTHWidth: 18 Length: 370Spillover GRASSED CHANNELLocation SOUTHERN END OF DAM

## SPILLWAY:

## PRINCIPAL

1573Elevation 1578.5RC DROP INLETType GRASSED EARTH6' X 12.33'Width 60'Type of ControlUncontrolled

Controlled:

Type  
(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length  
of operating service

Chute Length

Height Between Spillway Crest  
& Approach Channel Invert  
(Weir Flow)

## OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ✓ Sluice \_\_\_\_\_ Conduit \_\_\_\_\_ Penstock \_\_\_\_\_Shape: CIRCULARSize: 24" PIPE 18" GATEElevations: Entrance Invert 1540.25Exit Invert 1539.5

Tailrace Channel: Elevation \_\_\_\_\_

## HYDROMETEROLOGICAL GAGES:

Type: NONE

Location: \_\_\_\_\_

Records:

Date - NONE

Max. Reading - \_\_\_\_\_

## FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

Method of Controlled Releases (mechanisms):

RESERVOIR DRAIN



DRAINAGE AREA: 4.43 SQ. MILES (2883 ACRES)

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FOREST & OPEN FIELDS - PARTLY STATE FOREST

Terrain - Relief: STEEP

Surface - Soil: EXPOSED ROCK AT SURFACE

Runoff Potential (existing or planned extensive alterations to existing  
(surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity  
including surcharge storage:

NONE

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the  
Reservoir perimeter:

Location: NONE

Elevation: \_\_\_\_\_

Reservoir:

Length @ Maximum Pool \_\_\_\_\_ (Miles)

Length of Shoreline (@ Spillway Crest) \_\_\_\_\_ (Miles)

PROJECT GRID

JOB	OQUAGA LAKE STATE PARK DAM		SHEET NO.	1	CHECKED BY		DATE	
SUBJECT	HYDROLOGIC/HYDRAULIC COMPUTATIONS				COMPUTED BY	RLW	DATE	4/2/80
DRAINAGE AREA OF RESERVOIR - PLANIMETERED FROM USGS QUAD								
$(30.85 \text{ IN}^2) (91.83 \frac{\text{ACRES}}{\text{IN}^2}) = 2832.95 \text{ ACRES} = 4.43 \text{ MI}^2$								
STAGE - STORAGE CAPACITY - TAKEN FROM INFORMATION PROVIDED BY OWNER								
SNYDER SYNTHETIC UNIT HYDROGRAPH								
$L = 2.3 \text{ MI} \quad L_{CA} = .97 \text{ MI}$								
$t_p = C_t (L + L_{CA})^{.3} = 2.0 [(2.3) + (.97)]^{.3} = 2.55$								
$t_r = \frac{t_p}{5.5} = \frac{2.55}{5.5} = .46 \text{ USE } \frac{1}{2} \text{ HOUR HYDROGRAPH}$								
$t_{pc} = t_p + .25(t_r - t_p) = 2.55 + .25(.5 - .46) = 2.56 \text{ HOURS}$								
HR #33 PMP RAINFALL								
ZONE 1 PMP RAIN = 20.5 IN								
6 HR = 118%								
12 HR = 128%								
24 HR = 138%								
48 HR = 142%								
$\text{TRSPK} = 1 - \frac{.3008}{(4.43)^{.19715}} = .776$								
BASE FLOW = 2 cfs/sq. mi $2(4.43) = 8.86$								

PROJECT GRID

JOB	OQUAGA LAKE STATE PARK DAM		SHEET NO.	2	CHECKED BY	DATE
SUBJECT	HYDROLOGIC / HYDRAULIC COMPUTATIONS		COMPUTED BY	RLW	DATE	4/2/80
DISCHARGE CAPACITY CALCULATIONS						
SERVICE SPILLWAY - 48 INCH CONCRETE PIPE			$A = \pi (2)^2 = 12.57 \text{ ft}^2$			
$Q = A \sqrt{\frac{2gH}{1 + K_e + K_d + K_f L}}$						
WATER SURFACE AT TOP OF DAM						
P.P.E. FLOW	$Q = 12.57 \sqrt{\frac{2(32.2)(1586 - 1537.33)}{1 + .5 + .45 + .00556(224.33)}} = 381.66 \text{ cfs}$					THIS CONTROLS
WEIR FLOW	$Q = C L H^{3/2} = (3.0)(24.66)(1586 - 1573)^{3/2} = 3467.6 \text{ cfs}$					
WATER SURFACE AT AUXILIARY SPILLWAY CREST						
P.P.E. FLOW	$Q = 12.57 \sqrt{\frac{2(32.2)(1578.5 - 1537.33)}{1 + .5 + .45 + .00556(224.33)}} = 351.22 \text{ cfs}$					THIS CONTROLS
WEIR FLOW	$Q = (3.0)(24.66)(1578.5 - 1573)^{3/2} = 954.2 \text{ cfs}$					
WATER SURFACE AT MAXIMUM KNOWN LEVEL						
P.P.E. FLOW	$Q = 12.57 \sqrt{\frac{2(32.2)(1574 - 1537.06)}{1 + .5 + .45 + .00556(224.33)}} = 331.62 \text{ cfs}$					
WEIR FLOW	$Q = 3.0(24.66)(1574 - 1573)^{3/2} = 73.0 \text{ cfs}$					THIS CONTROLS

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
OSWEGO LAKE STATE PARK DAM	3		
SUBJECT	COMPUTED BY	DATE	
HYDROLOGIC/HYDROLOGIC COMPUTATIONS	RLW	4/2/80	

AUXILIARY SPILLWAY CHANNEL

WATER SURFACE AT TOP OF DAM

$$Q = C L H^{3/2} = 2.6(80)(1586.0 - 1578.5)^{3/2} = 4212.4 \text{ cfs}$$
  

RESERVOIR DRAIN -  $A = \pi(1)^2 = 3.14 \text{ ft}^2$

WATER SURFACE AT PRINCIPAL SPILLWAY CREST

$$Q = (3.14) \sqrt{\frac{2(32.2)(1573 - 1540.5)}{1 + .5 + .00735(70)}} = 101.2 \text{ cfs}$$

Oregon State Ferry  
Dam and Lake Project  
10005 GE 10005

W.R. Dally 8/17/71

### Stage - Storage

The following planimetered area within the designated contour were done using planimeter No. 12.45 with setting 155.0 on scale 1"=500 feet.

CONTOUR	AREA			AVE. ACRES	ACRE FEET	ADDITIVE ACRE FEET
	SG. IN.	SG. FT.	ACRES			
1540	3.4	8500	0.19	1.30	6.50	0
1545	41.5	104320	2.40	6.63	33.40	6.50
1550	190.7	479200	10.95	16.33	81.65	39.90
1555	376.2	945000	21.70	25.65	125.25	121.55
1560	515.4	1270000	29.60	33.40	167.00	247.80
1565	649.5	1628000	37.20	42.20	211.00	416.80
1570	822.4	2055000	47.20	49.40	245.00	627.80
1573	899.1	2282000	51.60	55.20	265.60	726.60
1575	1026.1	2560000	56.50	64.40	322.00	892.20
1580	1223.6	3060000	70.00			1214.20



NEW YORK STATE  
OFFICE OF ENVIRONMENTAL CONSERVATION  
FLOOD PROTECTION BUREAU

[illegible]

NO		NMR		NMH		JOB SPECIFICATION				METRIC	
150	0	0	30	1DAY	IHR	IMIN	0	0	0	0	0
				JDPER	NWT	LROPT	TRCF				
				5	0	0					

[illegible]

SUB=AREA RUNOFF COMPUTATION

ISTAQ	ICOMP	IECON	ITAGE	JPLY	INAP	ISTAGE	IAUTO
1	0	0	0	0	1	0	0

HYDROGRAPH DATA									
TIME	WIND	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE
TIME	WIND	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE	WAVE
1	1	4.43	0.	4.43	0.70	0	0	0	0

SPRE	PHS	R6	PRECIP DATA				F4U	R72	R96
0.	20.50	111.00	R12	R24					
			123.00	132.00	142.00				

LRDPT	0	STKR	0.	DLTKR	0.	RYIDL	1.00	ERAIN	0.	LOSS DATA			RYICK	1.00	SNHTL	1.00	CNSTL	0.10	ALSMX	0.	RTIMP	0.
-------	---	------	----	-------	----	-------	------	-------	----	-----------	--	--	-------	------	-------	------	-------	------	-------	----	-------	----

UNIT HYDROGRAPH DATA  
TP= 2.55 CP=0.63 NTA= C

```

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.97 AFC K= 4.49 INTERVALS

RECESSION DATA
STRATQ= 9.00 QCSN= 9.00 RTIR= 1.00

```

UNIT HYDROGRAPH 27 END-QF-PERIOD ORIGINATES, LAG= 2.53 FCRLS, CP= 0.63 V'U= 1.00														
MO,DA	HR,MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	END-QF-PERIOD FLOW	MO,DA	FCRLS	PLPFCU	RAIN	EXCS	LOSS	COMP C
1.01	0.30	1	0.00	0.	0.00	9.	1.02	14.00	76	1.06	1.01	0.05	1531.	2124.
1.01	1.00	2	0.00	0.	0.00	9.	1.02	14.10	77	1.32	1.27	0.05		
1.01	1.30	3	0.00	0.	0.00	9.	1.02	14.10	77	1.32	1.27	0.05		

1.01	2.30	5	0.00	0.	0.00	0.00	9.	1.01	10	5.15	5.05	0.05	4382.
1.01	3.00	6	0.00	0.	0.00	0.00	9.	1.01	11	1.24	1.19	0.05	5565.
1.01	3.30	7	0.00	0.	0.00	0.00	9.	1.01	12	1.24	1.19	0.05	6833.
1.01	4.00	8	0.00	0.	0.00	0.00	9.	1.01	13	0.97	0.92	0.05	7921.
1.01	4.30	9	0.00	0.	0.00	0.00	9.	1.01	14	0.97	0.92	0.05	8597.
1.01	5.00	10	0.00	0.	0.00	0.00	9.	1.01	15	0.07	0.02	0.05	8679.
1.01	5.30	11	0.00	0.	0.00	0.00	9.	1.01	16	0.07	0.02	0.05	8126.
1.01	6.00	12	0.00	0.	0.00	0.00	9.	1.01	17	0.07	0.02	0.05	7208.
1.01	6.30	13	0.01	0.	0.01	0.01	9.	1.01	18	0.07	0.02	0.05	6197.
1.01	7.00	14	0.01	0.	0.01	0.01	9.	1.01	19	0.07	0.02	0.05	5167.
1.01	7.30	15	0.01	0.	0.01	0.01	9.	1.01	20	0.07	0.02	0.05	4205.
1.01	8.00	16	0.01	0.	0.01	0.01	9.	1.01	21	0.07	0.02	0.05	3388.
1.01	8.30	17	0.01	0.	0.01	0.01	9.	1.01	22	0.07	0.02	0.05	2735.
1.01	9.00	18	0.01	0.	0.01	0.01	9.	1.01	23	0.07	0.02	0.05	2213.
1.01	9.30	19	0.01	0.	0.01	0.01	9.	1.01	24	0.07	0.02	0.05	1795.
1.01	10.00	20	0.01	0.	0.01	0.01	9.	1.01	25	0.07	0.02	0.05	1461.
1.01	10.30	21	0.01	0.	0.01	0.01	9.	1.01	26	0.07	0.02	0.05	1195.
1.01	11.00	22	0.01	0.	0.01	0.01	9.	1.01	27	0.	0.	0.	980.
1.01	11.30	23	0.01	0.	0.01	0.01	9.	1.01	28	0.	0.	0.	805.
1.01	12.00	24	0.01	0.	0.01	0.01	9.	1.01	29	0.	0.	0.	660.
1.01	12.30	25	0.07	0.	0.07	0.07	9.	1.01	30	0.	0.	0.	534.
1.01	13.00	26	0.07	0.	0.07	0.07	9.	1.01	31	0.	0.	0.	429.
1.01	13.30	27	0.08	0.	0.08	0.08	9.	1.01	32	0.	0.	0.	360.
1.01	14.00	28	0.10	0.	0.10	0.10	9.	1.01	33	0.	0.	0.	268.
1.01	14.30	29	0.10	0.	0.10	0.10	9.	1.01	34	0.	0.	0.	209.
1.01	15.00	30	0.10	0.	0.10	0.10	9.	1.01	35	0.	0.	0.	162.
1.01	15.30	31	0.12	0.17	0.12	0.12	9.	1.01	36	0.	0.	0.	122.
1.01	16.00	32	0.09	0.04	0.09	0.09	45.	1.01	37	0.	0.	0.	71.
1.01	16.30	33	0.07	0.04	0.07	0.07	86.	1.01	38	0.	0.	0.	52.
1.01	17.00	34	0.07	0.02	0.07	0.07	132.	1.01	39	0.	0.	0.	37.
1.01	17.30	35	0.07	0.02	0.07	0.07	173.	1.01	40	0.	0.	0.	26.
1.01	18.00	36	0.07	0.02	0.07	0.07	196.	1.01	41	0.	0.	0.	17.
1.01	18.30	37	0.01	0.	0.01	0.01	196.	1.01	42	0.	0.	0.	16.
1.01	19.00	38	0.01	0.	0.01	0.01	179.	1.01	43	0.	0.	0.	14.
1.01	19.30	39	0.01	0.	0.01	0.01	156.	1.01	44	0.	0.	0.	13.
1.01	20.00	40	0.01	0.	0.01	0.01	132.	1.01	45	0.	0.	0.	10.
1.01	20.30	41	0.01	0.	0.01	0.01	108.	1.01	46	0.	0.	0.	10.
1.01	21.00	42	0.01	0.	0.01	0.01	88.	1.01	47	0.	0.	0.	9.
1.01	21.30	43	0.01	0.	0.01	0.01	73.	1.01	48	0.	0.	0.	9.
1.01	22.00	44	0.01	0.	0.01	0.01	60.	1.01	49	0.	0.	0.	9.
1.01	22.30	45	0.01	0.	0.01	0.01	50.	1.01	50	0.	0.	0.	9.
1.01	23.00	46	0.01	0.	0.01	0.01	41.	1.01	51	0.	0.	0.	9.
1.01	23.30	47	0.01	0.	0.01	0.01	35.	1.01	52	0.	0.	0.	9.
1.02	0.30	48	0.01	0.	0.01	0.01	30.	1.01	53	0.	0.	0.	9.
1.02	1.00	49	0.05	0.	0.05	0.05	26.	1.01	54	0.	0.	0.	9.
1.02	1.30	50	0.05	0.	0.05	0.05	22.	1.01	55	0.	0.	0.	9.
1.02	2.00	51	0.05	0.	0.05	0.05	20.	1.01	56	0.	0.	0.	9.
1.02	2.30	52	0.05	0.	0.05	0.05	17.	1.01	57	0.	0.	0.	9.
1.02	3.00	53	0.05	0.	0.05	0.05	16.	1.01	58	0.	0.	0.	9.
1.02	3.30	54	0.05	0.	0.05	0.05	14.	1.01	59	0.	0.	0.	9.
1.02	4.00	55	0.05	0.	0.05	0.05	13.	1.01	60	0.	0.	0.	9.
1.02	4.30	56	0.05	0.	0.05	0.05	12.	1.01	61	0.	0.	0.	9.
1.02	5.00	57	0.05	0.	0.05	0.05	10.	1.01	62	0.	0.	0.	9.
1.02	5.30	58	0.05	0.	0.05	0.05	10.	1.01	63	0.	0.	0.	9.
1.02	6.00	59	0.05	0.	0.05	0.05	15.	1.01	64	0.	0.	0.	9.
1.02	6.30	60	0.11	0.11	0.11	0.11	37.	1.01	65	0.	0.	0.	9.
1.02	7.00	61	0.16	0.11	0.16	0.16	80.	1.01	66	0.	0.	0.	9.
1.02	7.30	62	0.16	0.11	0.16	0.16	143.	1.01	67	0.	0.	0.	9.
1.02	8.00	63	0.16	0.11	0.16	0.16	219.	1.01	68	0.	0.	0.	9.
1.02	8.30	64	0.16	0.11	0.16	0.16	296.	1.01	69	0.	0.	0.	9.
1.02	9.00	65	0.16	0.11	0.16	0.16	363.	1.01	70	0.	0.	0.	9.
1.02	9.30	66	0.16	0.11	0.16	0.16	417.	1.01	71	0.	0.	0.	9.
1.02	10.00	67	0.16	0.11	0.16	0.16		1.01	72	0.	0.	0.	9.
1.02		68	0.16	0.11	0.16	0.16		1.01	73	0.	0.	0.	9.



1.02 12.00 72 0.10 0.11 0.02 322. 1.00 1.00 1.00 0. 0. 0. 9.  
 1.02 12.30 73 0.88 0.83 0.05 544. 1.00 1.00 1.00 0. 0. 0. 9.  
 1.02 13.00 74 0.88 0.83 0.05 602. 1.00 1.00 1.00 0. 0. 0. 9.  
 1.02 13.30 75 1.06 1.01 0.05 762. 1.00 1.00 1.00 0. 0. 0. 9.  
 1.02 13.30 75 1.06 1.01 0.05 1068. 1.00 1.00 1.00 0. 0. 0. 9.

STA 22.59 18.93 3.66 108978.  
 ( 574. ) ( 481. ) ( 93. ) ( 3082.91 )  
 CFS 108969.  
 CMS 3084.  
 1-INCHES 19.07  
 MM 484.33  
 AC-FT 4503.  
 THOUS CU M 5554.

HYDROGRAPH AT STA 1 FOR PLAN 1, FILE 1

THOUS CU M	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.
66.	22.	43.	66.	86.	58.
54.	44.	36.	30.	25.	17.
11.	9.	8.	7.	7.	6.
8.	40.	71.	109.	148.	209.
261.	301.	334.	534.	765.	1358.
2783.	3417.	4339.	4063.	3604.	1746.
1694.	1106.	898.	731.	597.	3058.
214.	134.	104.	81.	61.	402.
9.	7.	6.	6.	6.	26.
5.	5.	5.	5.	5.	18.
5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.

CFS 54464.  
 CMS 1543.  
 1-INCHES 9.53  
 MM 242.17  
 AC-FT 2251.  
 THOUS CU M 2777.

HYDROGRAPH AT STA 1 FOR PLAN 1, FILE 2

THOUS CU M	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.
18.	45.	86.	132.	173.	156.
108.	88.	73.	60.	50.	35.
22.	17.	16.	14.	13.	12.
15.	80.	143.	219.	296.	417.
522.	602.	762.	1068.	1531.	2124.
5565.	7927.	8597.	8679.	8126.	2757.
3388.	2213.	1795.	1461.	1195.	6157.
429.	268.	209.	162.	122.	660.
17.	14.	13.	12.	11.	37.
9.	9.	9.	9.	9.	10.
9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.

CFS 108969.  
 CMS 3086.  
 1-INCHES 19.07  
 MM 484.33  
 AC-FT 4503.  
 THOUS CU M 5554.

AC-FT  
THOUS CU M

3154. 4392. 400.  
3890. 5417. 554.

\*\*\*\*\*

# HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT DAM NO BREACH  
 ISTAQ ICOMP ITAPE IPTT IPTA ISTATE IAUTO  
 1 0 0 0 0 0  
 ROUTING DATA  
 IRES ISAME IDPT IPRP LSTR  
 0. 0. 1 1 0  
 NSTPS NSTOL LAG AMSKK X YSK STLPA ISPRNT  
 1 0 0 0. 0. 0. 0. -1573. -1

STAGE	1573.00	1574.00	1578.50	1586.00
FLOW	0.	74.00	351.00	4654.00
CAPACITY	0.	7.	40.	122.
ELEVATION	1540.	1545.	1550.	1559.
				1560.
				1565.
				1570.
				1573.
				1575.
				1580.
				1586.
				1592.
				1600.
				1614.

CREL SPWID COOW EXPW ELEV CLCL CAREA EXPL  
 1573.0 0. 0. 0. 0. 0. 0. 0.

DAM DATA  
 TOPEL COOD EXPD TAPNIC  
 1586.0 2.6 1.5 410.

WARNING \*\*\* TOP OF DAM, BOTTOM OF BREACH, OR LOW-LEVEL OUTLET IS NOT WITHIN RANGE OF GIVEN ELEVATIONS IN STORAGE-ELEVATION DATA  
 BOTTOM OF RESERVOIR ASSUMED TO BE AT 1540.00  
 STORAGE-ELEVATION DATA WILL BE EXTRAPOLATED ABOVE ELEVATION 1540.00

STATION 1, PLAN 1, RATIO 1  
 END-OF-PERIOD HYDROGRAPH ESTIMATES

OUTFLOW		STORAGE	
0.	0.	727.	727.
2.	2.	727.	727.
3.	3.	727.	727.
4.	4.	727.	727.
25.	25.	727.	727.
26.	26.	727.	727.
27.	27.	727.	727.
28.	28.	727.	727.
29.	29.	727.	727.
30.	30.	727.	727.
31.	31.	727.	727.
32.	32.	727.	727.
33.	33.	727.	727.
34.	34.	727.	727.
35.	35.	727.	727.
36.	36.	727.	727.
37.	37.	727.	727.
38.	38.	727.	727.
39.	39.	727.	727.
40.	40.	727.	727.
41.	41.	727.	727.
42.	42.	727.	727.
43.	43.	727.	727.
44.	44.	727.	727.
45.	45.	727.	727.
46.	46.	727.	727.
47.	47.	727.	727.
48.	48.	727.	727.
49.	49.	727.	727.
50.	50.	727.	727.
51.	51.	727.	727.
52.	52.	727.	727.
53.	53.	727.	727.
54.	54.	727.	727.
55.	55.	727.	727.
56.	56.	727.	727.
57.	57.	727.	727.
58.	58.	727.	727.
59.	59.	727.	727.
60.	60.	727.	727.
61.	61.	727.	727.
62.	62.	727.	727.
63.	63.	727.	727.
64.	64.	727.	727.
65.	65.	727.	727.
66.	66.	727.	727.
67.	67.	727.	727.
68.	68.	727.	727.
69.	69.	727.	727.
70.	70.	727.	727.
71.	71.	727.	727.
72.	72.	727.	727.
73.	73.	727.	727.
74.	74.	727.	727.
75.	75.	727.	727.
76.	76.	727.	727.
77.	77.	727.	727.
78.	78.	727.	727.
79.	79.	727.	727.
80.	80.	727.	727.
81.	81.	727.	727.
82.	82.	727.	727.
83.	83.	727.	727.
84.	84.	727.	727.
85.	85.	727.	727.
86.	86.	727.	727.
87.	87.	727.	727.
88.	88.	727.	727.
89.	89.	727.	727.
90.	90.	727.	727.
91.	91.	727.	727.
92.	92.	727.	727.
93.	93.	727.	727.
94.	94.	727.	727.
95.	95.	727.	727.
96.	96.	727.	727.
97.	97.	727.	727.
98.	98.	727.	727.
99.	99.	727.	727.
100.	100.	727.	727.

[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL	VELOC
CFS	3623.	2798.	1009.	363.	52549.	
CMS	103.	79.	29.	10.	1489.	
1°CHES		5.88	8.47	9.20	9.20	
MM		149.25	215.25	213.55	233.57	
AC-M		1388.	2001.	2171.	2171.	
CU M		1712.	2468.	2678.	2678.	

STATION 1, PLAN 1, PART 2

END-OF-PERIOD HYDROGRAPH (PLINATES

OUTFLOW			
1.	1.	2.	3.
3.	4.	4.	5.
5.	5.	6.	6.
6.	9.	16.	36.
7.	13.	24.	30.
49.	50.	51.	50.
47.	45.	43.	40.
46.	43.	44.	38.
37.	46.	53.	98.
38.	41.	63.	86.
137.	158.	231.	1360.
123.	187.	292.	2161.
5510.	7931.	8407.	4977.
3546.	3067.	2218.	5838.
603.	490.	337.	1305.
738.	395.	237.	315.
283.	255.	234.	304.
272.	262.	243.	209.
187.	180.	167.	217.
194.	173.	161.	144.
136.	127.	116.	149.
139.	123.	116.	107.
98.	93.	90.	110.
98.	90.	90.	82.
101.	98.	90.	82.
104.	98.	90.	82.

727.	727.	728.	728.	725.	729.	729.	730.
730.	730.	731.	731.	731.	731.	732.	732.
732.	732.	733.	733.	733.	733.	733.	733.
733.	733.	734.	734.	747.	747.	767.	772.
774.	780.	782.	783.	784.	783.	782.	781.
785.	779.	778.	777.	774.	772.	771.	770.
789.	769.	772.	771.	764.	811.	826.	841.
858.	875.	894.	916.	992.	1140.	1231.	1321.
1419.	1529.	1637.	1701.	1712.	1674.	1648.	1618.
1580.	1531.	1476.	1422.	1327.	1254.	1225.	1200.
1179.	1161.	1146.	1133.	1113.	1092.	1080.	1069.
1057.	1046.	1035.	1025.	1005.	966.	978.	965.
961.	953.	946.	939.	925.	913.	907.	901.
895.	890.	885.	880.	871.	862.	858.	854.
850.	846.	842.	838.	831.	825.	822.	815.

STORAGE

1573.0	1573.0	1573.0	1573.0	1573.0	1573.0	1573.0	1573.0
1573.0	1573.0	1573.0	1573.0	1573.0	1573.0	1573.0	1573.0
1573.1	1573.1	1573.1	1573.1	1573.1	1573.1	1573.1	1573.1
1573.1	1573.1	1573.1	1573.1	1573.1	1573.1	1573.1	1573.1
1573.6	1573.6	1573.7	1573.7	1573.7	1573.7	1573.7	1573.7
1573.6	1573.6	1573.6	1573.6	1573.6	1573.6	1573.6	1573.6
1573.5	1573.5	1573.5	1573.5	1573.7	1574.0	1573.5	1573.5
1574.6	1574.8	1575.0	1575.4	1576.5	1576.9	1580.3	1581.7
1583.2	1584.9	1586.6	1587.6	1587.7	1587.1	1586.7	1586.3
1585.7	1584.9	1584.1	1583.2	1581.8	1581.1	1580.2	1575.8
1579.5	1579.2	1578.9	1578.7	1578.4	1576.3	1577.9	1577.7
1577.6	1577.4	1577.2	1577.1	1576.9	1576.6	1576.3	1576.2
1576.1	1576.0	1575.8	1575.7	1575.6	1575.4	1575.2	1575.1
1575.1	1575.0	1574.9	1574.9	1574.7	1574.7	1574.6	1574.5
1574.5	1574.4	1574.4	1574.3	1574.3	1574.2	1574.2	1574.1

STAGE

PEAK OUTFLOW IS 8618. AT TIME 42.50 HOURS

CFS	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
8618.	8618.	5964.	2104.	741.	166749.
244.	244.	169.	60.	21.	3023.
INCHES		12.52	17.67	18.68	18.68
MM		318.07	448.93	474.46	474.46
AC-FT		2927.	4174.	5411.	5411.
THOUS CU M		3648.	5148.	5441.	5441.

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULATED PLAN-RATIO ECONOMIC COMPUTATIONS  
 FLOWS IN CUBIC FEET PER SECOND (CUBIC FEET PER SECOND)  
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				0.50	1.00
HYDROGRAPH AT	1	4.43	1	4339.	8679.
	(	0.00)	(	122.88)	( 245.75)
ROUTED TO	1	4.43	1	3623.	8618.
	(	0.00)	(	102.60)	( 244.03)

# SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

ELEVATION		INITIAL VALUE		SPILLWAY CREST		TOP OF DAM			
STORAGE		1573.00		1573.00		1586.00			
OUTFLOW		727.		727.		1601.			
		0.		0.		4654.			
MAXIMUM		MAXIMUM		MAXIMUM		DURATION		TIME OF	
RESERVOIR		DEPTH		STORAGE		OVER TCP		MAX OUTFLOW	
M.S.ELEV		OVER DAM		AC-FT		HOURS		HOURS	
1584.20		0.		14.25		0.		43.50	
1597.79		1.79		1716.		4.00		42.50	
RATIO								TIME OF	
OF								FAILURE	
PHF								HOURS	
0.50								0.	
1.00								0.	

APPENDIX D  
SUBSURFACE BORING LOGS

DISTRICT NO. 9  
COUNTY Essex  
S.S.M. PROJ. NO. 100-01-751

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION  
SOIL MECHANICS BUREAU  
SUBSURFACE EXPLORATION LOG  
(STATE FORCES)

HOLE NO. 100-01-751  
LINE & STA. 0 + 10  
OFFSET on CL

PROJECT Quana State Park

QUAD. LOCATION

DATE, START

9/27/71

SURF. ELEV. 164.0

SOIL SERIES

DATE, FINISH

9/30/71

DEPTH TO WATER

(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4.0

I.D. 3 7/8

WEIGHT OF HAMMER 100#

HAMMER FALL

SAMPLER O.D. 2"

I.D. 1 3/8"

INSIDE LENGTH OF SAMPLER 21"

CASING 18" SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER					CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
			0	6	12	18	24					
0	30										GRAVEL, sand, some silt	compact, non-plastic
	100											
	126											
	105											
5	20	J1	21	22				12.1		Br	(0.0 to 9.0)	
	21				12							
	28											
	30											
	103											
	35	J2	13	14				10.6		Br	SAND, some gravel & silt (9.0-10.0) non-plastic	
10	65	J3	33					6.6		Br	GRAVEL & SAND, some silt	non-plastic
	104											
	112										(10.0 to 14.0)	
	103											
15	50	J4	13	20				7.4		Br	SAND, some gravel & silt	med. comp., non-plastic
	76				20							
	580											
	645											
	58										(14.0 to 20.0)	
	61											
20	114	J5	15	24				8.7		Br	SHALE, some sand & silt	hard, non-plastic
	118				28							
	142										(20.0 to 29.0)	BOULDER 23.8-24.8'
	439											
25	111											
	205											
	175											
	233											
	376											
30	140	J6	49	56				8.2		Br	SAND, some gravel & silt	very compact, non-plastic
	92				48						(29.0 to 34.0)	
	141											
	195											
	225											
35											SANDSTONE	1st run Diamond
											(34.0 to 39.0)	5.0' Run 15 pscs.
												3.7' Rec.
40											SANDSTONE	2nd Run Diamond
											(39.0 to 44.0)	5.0' run 8 pscs.
												5.0' Rec.
45											SANDSTONE	3rd Run Diamond
											(44.0 to 49.0)	5.0' Run 4 pscs.
												4.5' Rec.
50												

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. N. Stevens

SOIL DESCRIPTIONS 2. Viskelley & C. Deane

ROCK DESCRIPTIONS

DISTRICT SOILS ENGR. W. M. Green

SHEET 1 OF 2

HOLE NO. 100-01-751

DW2



DISTRICT NO. 9  
COUNTY Franklin  
B.S.M. PROJ. NO. 100-01-701

DEPARTMENT OF TRANSPORTATION  
SOIL MECHANICS BUREAU  
SUBSURFACE EXPLORATION LOG  
(STATE FORCES)

HOLE NO. W-2  
LINE & STA. 0+10  
OFFSET 00

PROJECT Coauga State Park

QUAD. LOCATION \_\_\_\_\_ DATE, START 9/27/71 SURF. ELEV. 1500.0  
SOIL SERIES \_\_\_\_\_ DATE, FINISH 9/30/71 DEPTH TO WATER \_\_\_\_\_  
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4 1/4" I.D. 3 7/8" WEIGHT OF HAMMER 300# HAMMER FALL \_\_\_\_\_  
SAMPLER O.D. 2" I.D. 1 7/8" INSIDE LENGTH OF SAMPLER 21" CASING 18" SAMPLER 12"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER				CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
			0	5	10	15					
0			6	12	18	24				SHALE (49.0 to 54.0)	4th Run Diamond 5.0' Run 27 pscs. 4.4' Rec.
55										NOTE: Hit boulders 16.0' - 18.0' Drilled through with Hawthorne & Diamond. Drove casing to 18.0' had to drill out again. Then drove to 19.0'. Hit boulder at 23.8'-24.8'; drilled through with Diamond, then blasted and con't. Drilled ahead of casing from 4.0'-34.0' lost water while coring rock at 37.0'	Bottom of hole 54.0'

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. N. Stevens  
SOIL DESCRIPTIONS R. Michalek & T. P. Schmitt  
ROCK DESCRIPTIONS \_\_\_\_\_  
DISTRICT SOILS ENGR. H. M. Green  
SHEET 2 OF 2 HOLE NO. W-2



DISTRICT NO. <u>9</u>		STATE OF NEW YORK DEPARTMENT OF TRANSPORTATION SOIL MECHANICS BUREAU SUBSURFACE EXPLORATION LOG (STATE FORCES)		HOLE NO. <u>1</u> LINE & STA. <u>CL. Station 7</u> OFFSET <u>      </u>			
COUNTY <u>Broome</u>		PROJECT <u>Cayuga State Park</u>		QUAD. LOCATION <u>      </u>			
B.S.M. PROJ. NO. <u>2100-01-701</u>		DATE, START <u>9/30/71</u>		SURF. ELEV. <u>1523.3</u>			
SOIL SERIES <u>      </u>		DATE, FINISH <u>10/5/71</u>		DEPTH TO WATER <u>16.0'</u>			
CASING O.D. <u>4"</u> I.D. <u>3 7/8"</u>		WEIGHT OF HAMMER <u>300#</u>		HAMMER FALL <u>      </u>			
SAMPLER O.D. <u>2"</u> I.D. <u>1 3/8"</u>		INSIDE LENGTH OF SAMPLER <u>21"</u>		CASING <u>18"</u> SAMPLER <u>12"</u>			
DEPTH FEET	BLWGS ON CASING	BLWGS ON SAMPLER	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0							
28						SAND, some gravel & silt	
35						(0.0 to 9.0)	compact, non-plastic
56							
84							
5	J1	16	18		22.4	Br	
60							
62							
78							
100							
10	J2	14	15		10.1	Br	
40							
43							
80							
95							
15	J3	21	20		9.5	Br	
102							
156							
116							
175							
20	J4	11	10		10.4	Br	
170							
145							
132							
207							
25	J5	70			11.0	Br	
72							
GRAVEL & SAND, some silt (19.0 to 24.0)							compact, non-plastic
GRAVEL & SAND, some silt (24.0 to 29.0)							compact, non-plastic
GRAVEL & SAND, some silt (29.0 to 30.0)							compact, non-plastic
GRAVEL & SAND, some silt (30.0 to 35.0)							compact, non-plastic
GRAVEL & SAND, some silt (35.0 to 40.0)							compact, non-plastic
GRAVEL & SAND, some silt (40.0 to 45.0)							compact, non-plastic
GRAVEL & SAND, some silt (45.0 to 50.0)							compact, non-plastic
GRAVEL & SAND, some silt (50.0 to 55.0)							compact, non-plastic
GRAVEL & SAND, some silt (55.0 to 60.0)							compact, non-plastic
GRAVEL & SAND, some silt (60.0 to 65.0)							compact, non-plastic
GRAVEL & SAND, some silt (65.0 to 70.0)							compact, non-plastic
GRAVEL & SAND, some silt (70.0 to 75.0)							compact, non-plastic
GRAVEL & SAND, some silt (75.0 to 80.0)							compact, non-plastic
GRAVEL & SAND, some silt (80.0 to 85.0)							compact, non-plastic
GRAVEL & SAND, some silt (85.0 to 90.0)							compact, non-plastic
GRAVEL & SAND, some silt (90.0 to 95.0)							compact, non-plastic
GRAVEL & SAND, some silt (95.0 to 100.0)							compact, non-plastic
GRAVEL & SAND, some silt (100.0 to 105.0)							compact, non-plastic
GRAVEL & SAND, some silt (105.0 to 110.0)							compact, non-plastic
GRAVEL & SAND, some silt (110.0 to 115.0)							compact, non-plastic
GRAVEL & SAND, some silt (115.0 to 120.0)							compact, non-plastic
GRAVEL & SAND, some silt (120.0 to 125.0)							compact, non-plastic
GRAVEL & SAND, some silt (125.0 to 130.0)							compact, non-plastic
GRAVEL & SAND, some silt (130.0 to 135.0)							compact, non-plastic
GRAVEL & SAND, some silt (135.0 to 140.0)							compact, non-plastic
GRAVEL & SAND, some silt (140.0 to 145.0)							compact, non-plastic
GRAVEL & SAND, some silt (145.0 to 150.0)							compact, non-plastic
GRAVEL & SAND, some silt (150.0 to 155.0)							compact, non-plastic
GRAVEL & SAND, some silt (155.0 to 160.0)							compact, non-plastic
GRAVEL & SAND, some silt (160.0 to 165.0)							compact, non-plastic
GRAVEL & SAND, some silt (165.0 to 170.0)							compact, non-plastic
GRAVEL & SAND, some silt (170.0 to 175.0)							compact, non-plastic
GRAVEL & SAND, some silt (175.0 to 180.0)							compact, non-plastic
GRAVEL & SAND, some silt (180.0 to 185.0)							compact, non-plastic
GRAVEL & SAND, some silt (185.0 to 190.0)							compact, non-plastic
GRAVEL & SAND, some silt (190.0 to 195.0)							compact, non-plastic
GRAVEL & SAND, some silt (195.0 to 200.0)							compact, non-plastic
GRAVEL & SAND							

DISTRICT NO. 9  
COUNTY Essex  
S.S.M. PROJ. NO. ELCO-01-701

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION  
SOIL MECHANICS BUREAU  
SUBSURFACE EXPLORATION LOG  
(STATE FORCES)

HOLE NO. 224  
LINE & STA. 10+00  
OFFSET 10.0 ft.

PROJECT Canaan State Park

QUAD. LOCATION \_\_\_\_\_ DATE, START 10/6/71 SURF. ELEV. 1539.3  
SOIL SERIES \_\_\_\_\_ DATE, FINISH 10/8/71 DEPTH TO WATER \_\_\_\_\_  
(ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. \_\_\_\_\_ I.D. \_\_\_\_\_ WEIGHT OF HAMMER \_\_\_\_\_ HAMMER FALL \_\_\_\_\_  
SAMPLER O.D. \_\_\_\_\_ I.D. \_\_\_\_\_ INSIDE LENGTH OF SAMPLER \_\_\_\_\_ CASING \_\_\_\_\_ SAMPLER \_\_\_\_\_

DEPTH BELOW SURFACE	BLOWS ON CASING	BLOWS ON SAMPLER	CROSS SECTION	MOISTURE	COLOR	DESCRIPTION OF SOIL AND ROCK	REMARKS
0						SANDSTONE	1st Run Diamond 5.0' Run 4 pscs. 5.0' Rec. 0.0 to 5.0'
5						SANDSTONE	2nd run Diamond 4.2' Run 9 pscs. 5.0' Rec. 5.0 to 9.2'
10						SANDSTONE	3rd Run Diamond 5.0' Run 4 pscs. 5.0' Rec. 9.2' to 14.2'
15						SANDSTONE	4th Run Diamond 5.0' Run 7 pscs. 5.0' Rec. 14.2' to 19.2'
20						SANDSTONE	5th Run Diamond 3.7' Run 3 pscs. 3.7' Rec. 19.2' to 22.9'
25						SANDSTONE	6th run Diamond 3 pscs. 3.7 Rec. 22.9' to 26.0'
30						SANDSTONE	7th Run Diamond 6 pscs. 4.3 Rec. 26.0' to 30.0'
35						SANDSTONE	8th Run Diamond 3 pscs. 4.9' Rec. (30.0 to 35.0')
40						SANDSTONE	9th Run Diamond 2 pscs. 4.2' Rec. 35.0' to 40.0'
45						SANDSTONE	10th Run Diamond 2 pscs. 4.8' Rec. 40.0' to 45.5'
50							Bottom of hole 45.5'

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR C. W. Stevens  
SOIL DESCRIPTIONS \_\_\_\_\_  
ROCK DESCRIPTIONS \_\_\_\_\_  
DISTRICT SOILS ENGR. H. W. Grier  
SHEET 1 OF 1 HOLE NO. 224



APPENDIX E

REFERENCES

## APPENDIX E

### REFERENCES

- 1) U.S. Department of Commerce; Weather Bureau;  
Hydrometeorological Report No. 33 - Seasonal Variation of the Probable  
Maximum Precipitation East of the 105th Meridian for Areas from 10 to  
1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours, April 1956.
- 2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition,  
McGraw-Hill, 1963.
- 3) University of the State of New York, Geology of New York, Education  
Leaflet 20, Reprinted 1973.
- 4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960.
- 5) U.S. Department of the Interior, Bureau of Reclamations;  
Design of Small Dams, 2nd edition (rev. reprint), 1977.

**APPENDIX F**

**DRAWINGS**





VICINITY MAP  
 OQUAGA CRIK STATE PARK DAM  
 I.D. No. NY 783

Road

MON 8

STATION IS CENTER OF MON  
BENCH MARK IS HIGHEST POINT ON

1575

1570

ROAD

1570

STILLING BASIN - FOR  
DETAILS SEE DWG  
NO 72/5012

1550

1540

1

B

1530

SPRINGS ROAD HAVING  
95 14 65 AND E 202 912 12

A

1590

1588

586

E DAM

APPEA

WATER ELEVATION

1584

1584

1580

1578

1576

1574

1572

FOR SHORELINE GRADING ON

$\Delta = 21.15$   
 $R = 2.5$   
 $L = 79.70$

BEARING S 10° 07' E

9' 9'

2+00

(ABANDONED)

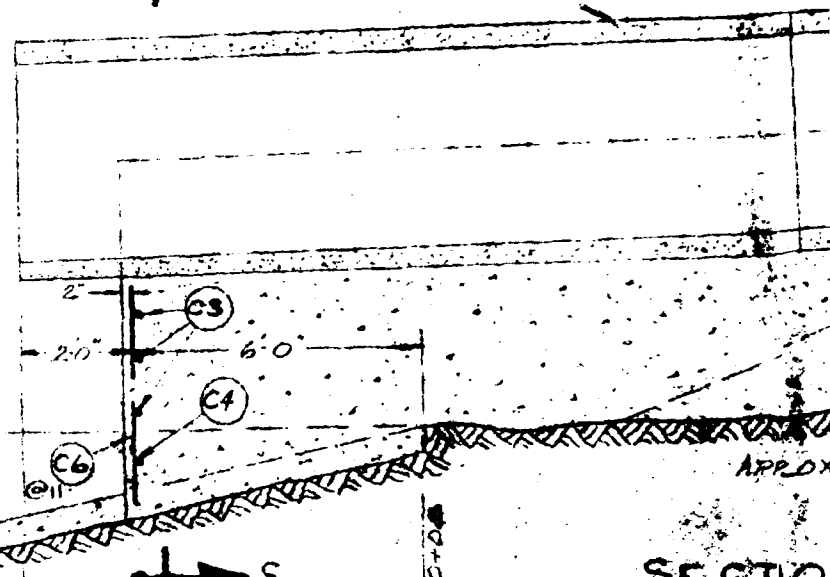
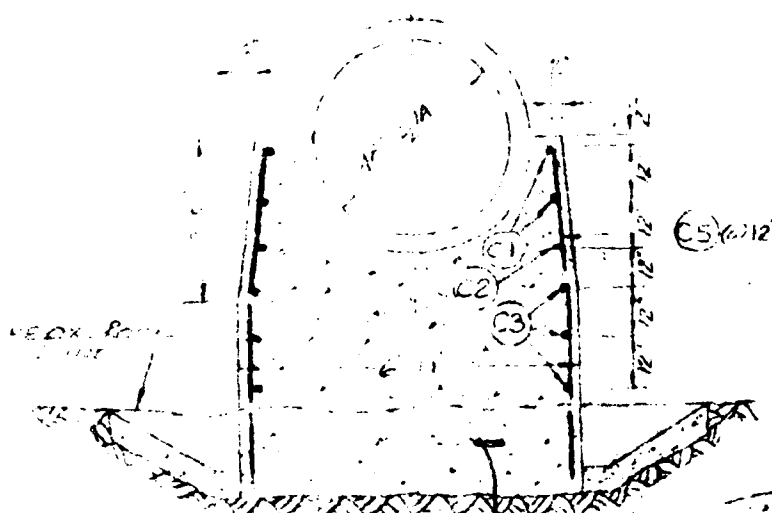
WOODED

2

PRINCIPAL SILL

R ←

→ S



SECTION S-S

A lot of extra Concrete?

CONC LINED STILLING BASIN  
SEE DWG. NO 72/5012

SECTION

PRINCIPLE IS  
CRADLE ROAD  
STA. 0+00 TO S  
SCALE 1"=4'

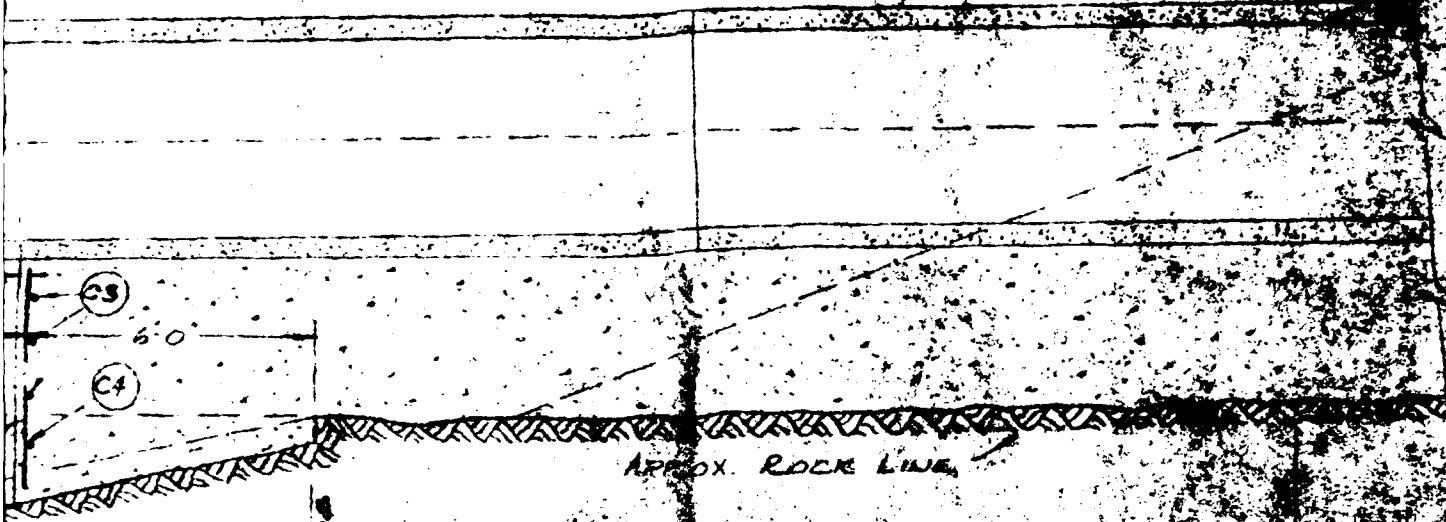
ON UPSTREAM SLOPES SEE DWG. NO 72/5002

MARK	SIZE
C1	4
C2	4
C3	4
C4	4
C5	4
C6	4

TYPE

3

REMOVE EXIST EARTH AND ROCK,  
FILLED GULVERT CROSSING



## SECTION R-R

FIXED SETTLING BASIN  
DWG. NO. 72/5012

REINFORCED CONC. CRACKS  
SEE SECTION S-S

PRINCIPLE SPILLWAY  
CRACKLE REINFORCING  
STA. 0+00 TO STA. 0+125  
SCALE 1/4" = 1'-0"

STEEL SCHEDULE							
MARK	SIZE	QTY	LENGTH	TYPE	B	E	REMARKS
C1	4	4	26'-0"	1			24'-0"
C2	4	2	26'-0"	21	2'-0"	2'-0"	16'-0"
C3	4	6	26'-0"	21	4'-0"	4'-0"	16'-0"
C4	4	2	16'-0"	21	4'-0"	2'-0"	16'-0"
C5	4	9	5'-3"	31	2'-0"	3'-0"	16'-0"
C6	4	8	4'-9"	1			30'-0"

TYPE 1  
21  
31

3

1

11.19.80  
11.19.80  
11.19.80

WOODED

APC 80  
EID 574 35

1500

WOODED

SLOPE 1:2.5

5

RAILROAD RILLWAY

1+00

COUGASA

STA 2+93 & DAM  
STA 1+59 & RILLWAY

2+00

CREEK

RESERVOIR DRAIN

CONC. RISER

SLOPE

SETTLED SLOPE 1:1.5

SETTLED SLOPE 1:1

WOODED

10  
BERM

1=600  
R=120  
L=125.00

1520

1000

4+00

STA 8+74.40  
ELEV 575.98

STA 4+35 & DAM

NO. 1 RILLWAY

STA 10+50

ELEV 1578.50

0.00%

PT 10+00

ELEV 1578.50

2.20%

5+00

14°

& DAM

6

STYRENE EARTH AND ROCK  
FILLED COVERT CROSSING

**B BEAVER POND**

W.S. EL. 1540.7 ±

NO BORROW PERMITTED WITHIN  
100' OF DAM TOE

NOTE: SPREAD 4" TOPSOIL AND SEED ON BOTTOM AND SLOPES OF  
EMERGENCY SPILLWAY AND ON EXPOSED AREAS OF DAM  
EMBANKMENT NOT COVERED WITH RIP-RAP.

7



WOODED

APC 80  
ELEV 374 38

1500

WOODED

SLOPE 1:2.5

15

1620

CONTRACT LIMIT LINE

1630

15

Δ=61.6  
P=120  
L=123.90

4+00

2+9+74.40  
ELEV 575.99

STA 4+35 & DAM

PT 10+00  
ELEV 1576.50

2.0%

5+00

14°

& DAM

6

6+00



**PLOT PLAN**  
SCALE 1" = 20'

9

NOTE: SPREAD 4" TOPSOIL AND SEED ON BOTTOM AND SLOPES OF  
EMERGENCY SPILLWAY AND ON EXPOSED AREAS OF DAM  
EMBANKMENT NOT COVERED WITH RIP-RAP.

1570

1580

1590

1600

1610

7

13

AND SEED ON BOTTOM AND SLOPES OF  
AND ON EXPOSED AREAS OF DAM  
COVERED WITH RIP-RAP.

STATE OF NEW YORK  
EXECUTIVE DEPARTMENT  
BUREAU OF PARKS AND RECREATION

ALEXANDER ALDRICH  
CENTRAL NEW YORK  
PARKS COMMISSIONER  
JAMESVILLE

MOQUASIA CREEK STATE PARK  
DAM & LAKE DEVELOPMENT

GENERAL ENGINEERING

PLOT PLAN

SECTIONS

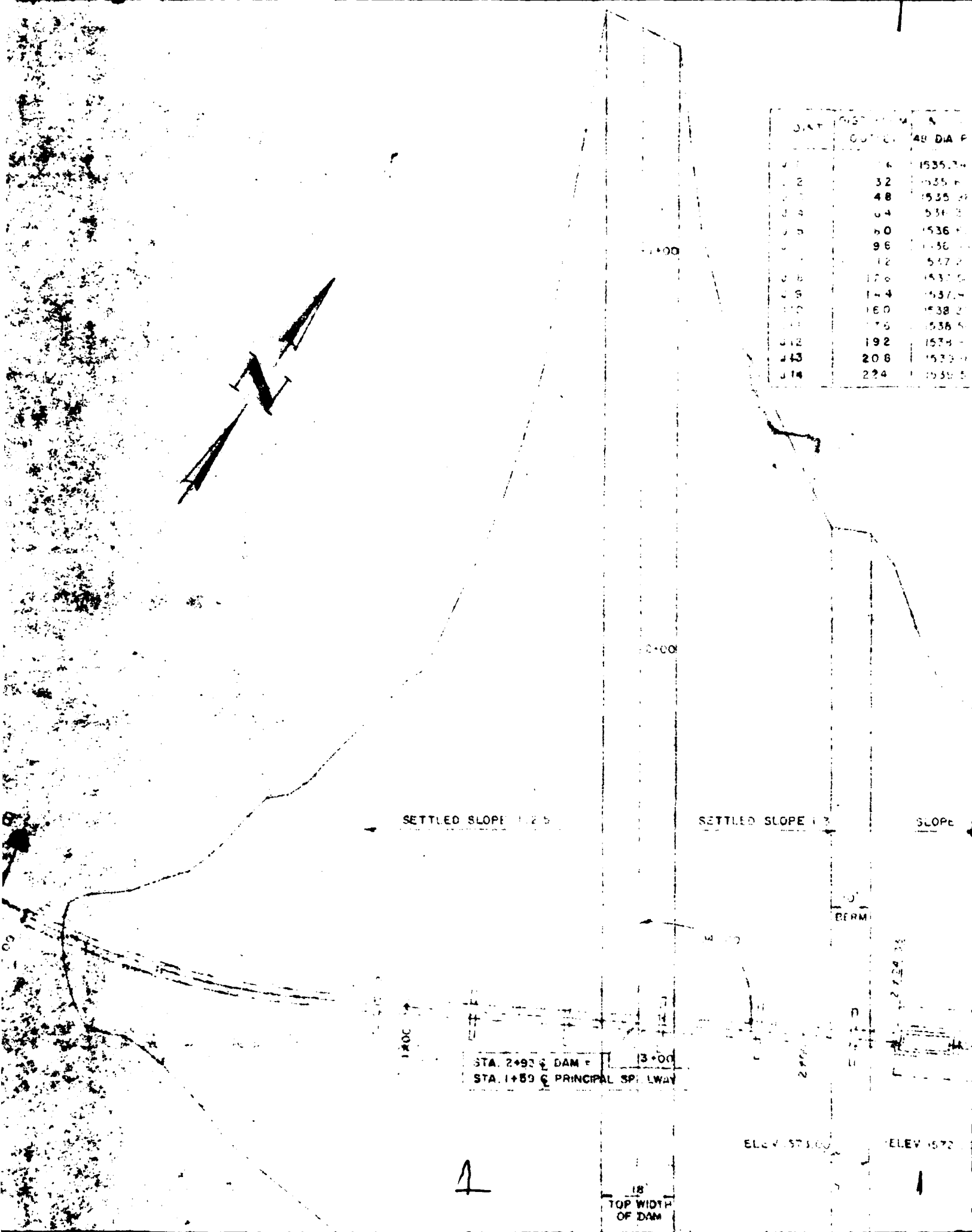
STATE OF NEW YORK - ENGINEERING  
OFFICE OF CHIEF ENGINEER  
DESIGN AND CONSTRUCTION

J. C. WILSON  
CHIEF ENGINEER

DESIGNED BY	DATE	SCALE
W. B. WILSON	1-1-24	1" = 10'
CHECKED BY	DATE	SCALE
J. C. WILSON	1-1-24	1" = 10'

APPROVED BY	DATE
J. C. WILSON	1-1-24
REVISIONS	
NO.	DESCRIPTION
1	AS SHOWN

STATION	OUTLINE	48 DIA P
1	6	1535.74
2	32	1535.8
3	48	1535.8
4	64	1536.2
5	80	1536.8
6	96	1536.8
7	112	1537.2
8	128	1537.5
9	144	1537.4
10	160	1538.2
11	176	1538.5
12	192	1538.8
13	208	1539.4
14	224	1539.5



SETTLED SLOPE 1:2.5

SETTLED SLOPE 1:2

SLOPE

10' BERM

STA. 2+93 1/2 DAM  
STA. 1+59 1/2 PRINCIPAL SPILLWAY

13.00

ELEV 1573.00

ELEV 1572

18'  
TOP WIDTH  
OF DAM

1

1

48" DIA PIPE	SLOPE	DEFLECTION
1535.34	2.00%	4" 15'
1535.68		4" 15'
1535.96		4" 15'
1536.30		4" 15'
1536.62		4" 15'
1536.94		
1537.26		
1537.58		
1537.90		
1538.22		
1538.54		
1538.86		
1539.18		
1539.50		

COLLAR	ST FROM	48" DIA PIPE
1-	92	1536.86
116		1537.34
140		1537.82
164		1538.30
188		1538.78
212		1539.26

1590

NOTE "A": APPROX. DEPTH OF CRADLE EXCAVATION  
ACTUAL DEPTH TO BE TO SOUND ROCK  
IN ACCORDANCE WITH CRADLE SECT.

1580

NOTE "B": FOR LOCATION AND DETAILS OF STILL  
SEE DWG NO 72/5005 & 72/5012

1570

1560

1550

1540

1535.02  
48" INV.

1530

SEE NOTE "B"

SEE NOTE "A"

2'-0"

26'-0"

REIN. CONC. CRADLE

STA 0700

48" R

SLOPE 1:3

B

2

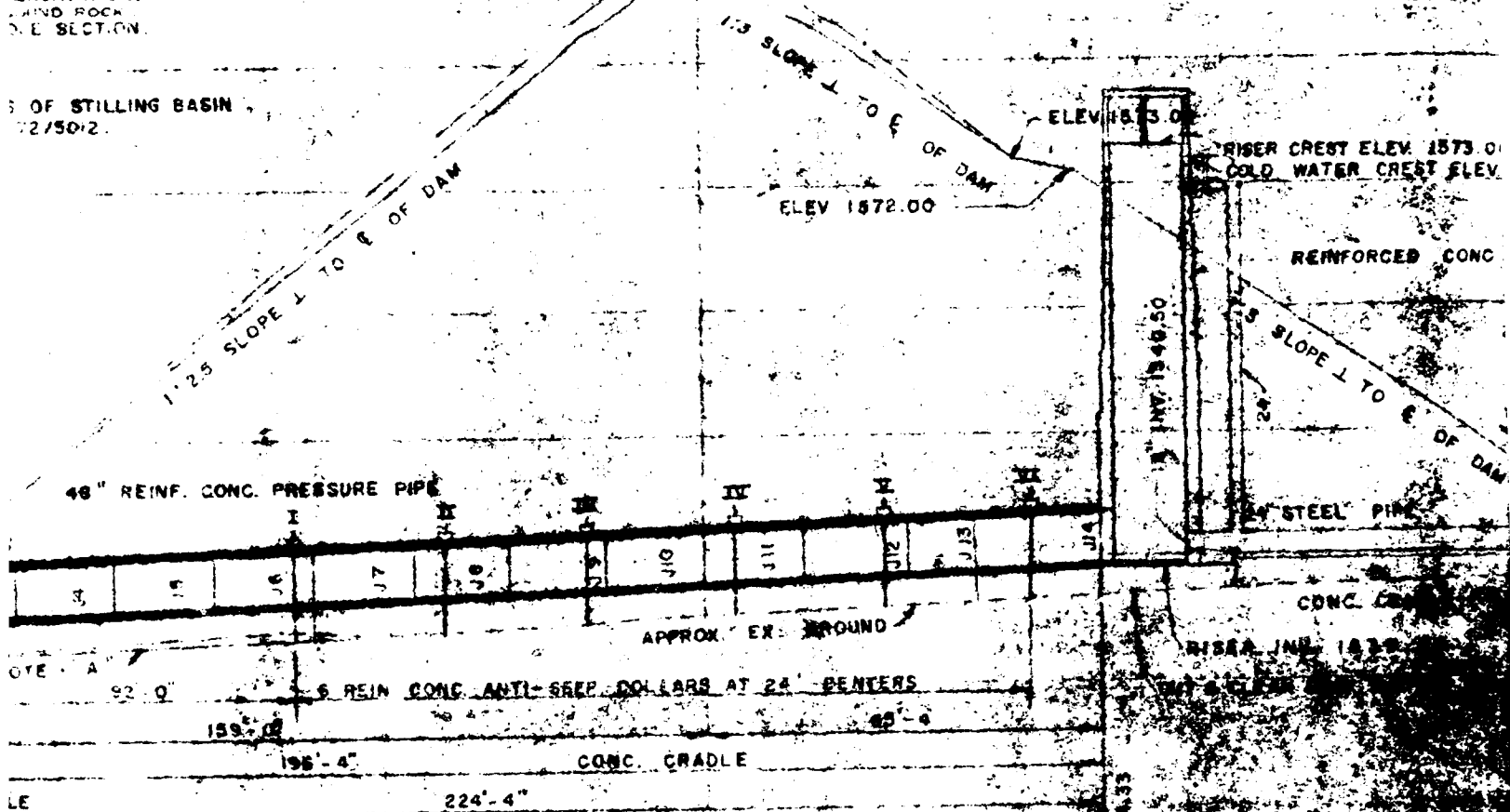
EXCAVATION.  
HIND ROCK  
ONE SECTION.

OF STILLING BASIN  
72/5012.

E DAM

TOP OF CONSTRUCTED FILL (SEE SECTION A-A)

TOP OF SETTLED DAM ELEV. 1586.00



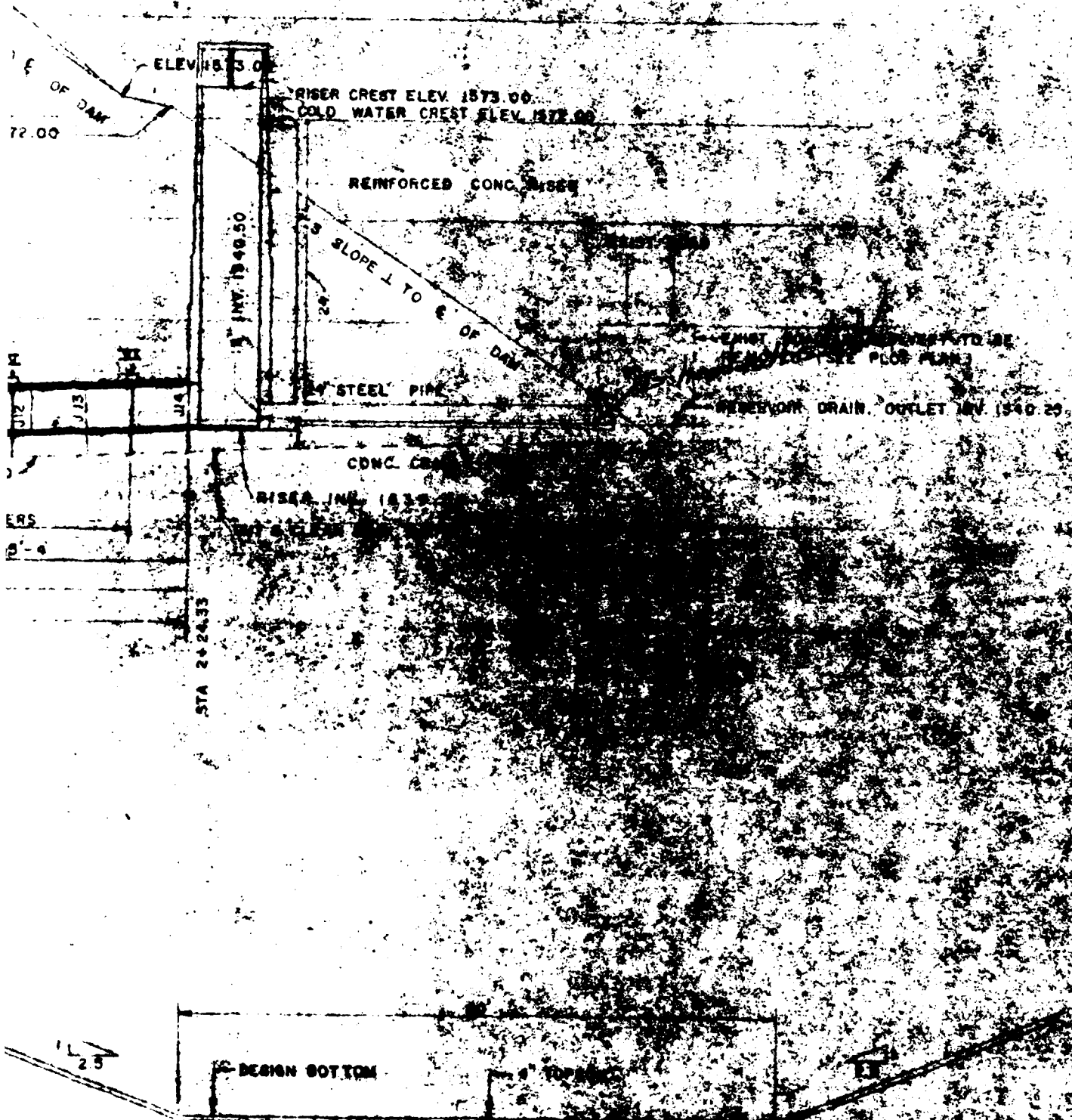
### SECTION B-B

SCALE: HORZ. 1" = 20'  
VERT. 1" = 10'

### SECTION - EMERGENCY

CONSTRUCTED FILL (SEE SECTION A-A)

SETTLED DAM ELEV. 1586.00



**SECTION - EMERGENCY DRAIN**

SCALE 1" = 10'



SECTION 101  
OF 102

SECTION 101  
OF 102

4.1

# PLAN - CONDUIT SYSTEMS

SCALE 1"=20'

1630  
1620  
1610  
1600  
1590  
1580  
1570  
1560  
1550  
1540

EMERGENCY SPILLWAY  
ELEV. 1580.0

5

STA 1+80  
ELEV 1574

DOWNSTREAM

EMERGENCY SPILLWAY DESIGN BOTTOM (TYP)

ALL SPILLWAY SECTIONS PERPENDICULAR TO  
SHALL BE CONSTRUCTED LEVEL

STA 2+00  
ELEV 1580.00

STA 2+80  
ELEV 1588.00

TOP OF CONSTRUCTION FILL

TOP OF SETTLED DAM, ELEV 1586.00

EXIST. ROAD

EXIST. ROAD

EXIST. ROAD

E OF PRINCIPAL SPILLWAY AT E DAM STA 2+93

- APPROX EXISTING GROUND

STRIPPED GROUND LINE

STA 99  
ELEV 1574.99

STA 10+50  
ELEV 1578.50

STA 10+00  
ELEV 1578.50

4" TOPSOIL

2.70%

0.00%  
BOTTOM OF EXCAVATION

TO SPILLWAY E

### C PROFILE - EMERGENCY SPILLWAY

SCALE: HORIZ. 1" = 20'  
VERT. 1" = 10'

STA 0+42  
ELEV 1586.00

STA 0+00

GROUND LINE

STRIPPED GROUND LINE

STA 1+50  
ELEV. 1578.50

STA 10+00  
ELEV. 1578.50

STA 8+42.5  
ELEV. 1575.34

UPSTREAM

BOTTOM OF EXCAVATION

SPILLWAY

STA 0+42  
ELEV. 1596.00

STA. 0+00

STATE OF NEW YORK  
EXECUTIVE DEPARTMENT  
PARKS & RECREATION

ALEXANDER ALDRICH COMMISSIONER

CENTRAL NEW YORK STATE  
PARKS COMMISSION  
JAMESVILLE NEW YORK

OQUAGA CREEK STATE PARK  
DAM & LAKE DEVELOPMENT

GENERAL ENGINEERING

PRINCIPAL SPILLWAY  
PLAN & SECTIONS

EMERGENCY SPILLWAY  
PROFILE & SECTIONS

STATE OF NEW YORK - EXECUTIVE DEPARTMENT  
OFFICE OF GENERAL SERVICES  
DESIGN AND CONSTRUCTION

A.C. O'HARA  
JERRY STEVENS, JR.

DESIGNED BY W.E.D. R.F.R.	DATE AUG. 1974	SCALE AS SHOWN
DRAWN BY	CHECKED BY	APPROVED BY

# PLAN - CONDUIT SYSTEMS

DATE: 1-24

1630

1620

1610

1600

1590

1580

EMERGENCY SPILLWAY

1570

1570

1560

5

1550

1540

1530

6-00

9

ALL DRAINAGE SECTIONS PERPENDICULAR  
SHALL BE CONSTRUCTED 1:1

STA 2+80  
ELEV 1588.00

STA 2+80  
ELEV 1588.00

TOP OF CONSTRUCTION FILL

TOP OF SETTLED DAM, ELEV 1592.00

EXIST. ROAD

EXIST. ROAD

EXIST. ROAD

C OF PRINCIPAL SPILLWAY AT C DAM STA 2+93

### SECTION A-A

SCALE: HORIZ. 1" = 20'  
VERT. 1" = 10'

(SEE DWG. NO. 22/5005)

10

# Q PROFILE - EMERGENCY SPILLWAY

SCALE: HORIZ. 1" = 20'  
VERT. 1" = 10'

STA 0+42  
ELEV 1596.00

STA 0+00

STRIPPED GROUND LINE

7

1+00

0+00

11

WAY

STA 0+42  
ELEV 1556.00

STA 0+00

0+00

STATE OF NEW YORK  
EXECUTIVE DEPARTMENT  
PARKS & RECREATION

ALEXANDER ALDRICH COMMISSIONER

CENTRAL NEW YORK STATE  
PARKS COMMISSION

JAMESVILLE NEW YORK

OQUAGA CREEK STATE PARK  
DAM & LAKE DEVELOPMENT

GENERAL ENGINEERING

PRINCIPAL SPILLWAY  
PLAN & SECTIONS

EMERGENCY SPILLWAY  
PROFILE & SECTIONS

STATE OF NEW YORK - EXECUTIVE DEPARTMENT  
OFFICE OF GENERAL SERVICES  
DESIGN AND CONSTRUCTION

A.C. O'HARA  
BERRY STEVENS, JR.

DRAWN BY	DATE	SCALE	REVISION
W.S.D., R.F.H.	JAN 2, 1984	SHOWN	
TRACED BY	CHECKED BY	STRUCTURAL	
R.F.H.	J.E.C.	CHECK	

APPROVED BY PRD to E.L.H.

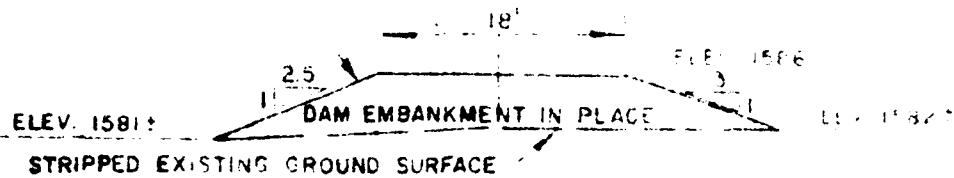
DATED JAN 2, 1984 LETTER NO 000037

PROJECT NO	DRAWING NO
10005	10005-01



4" TOPSOIL

Q OF DAM



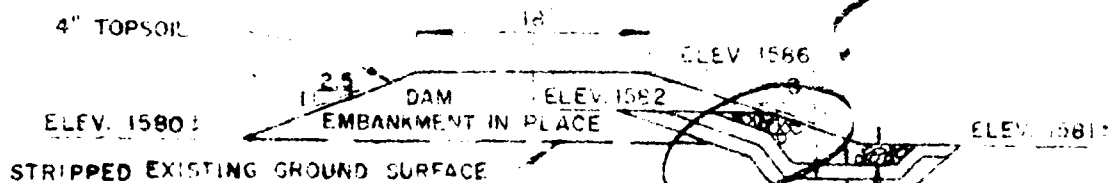
DATUM ELEV. 1570

### SECTION AT STA. 1+16

SCALE 1" = 10'

4" TOPSOIL

Q OF DAM

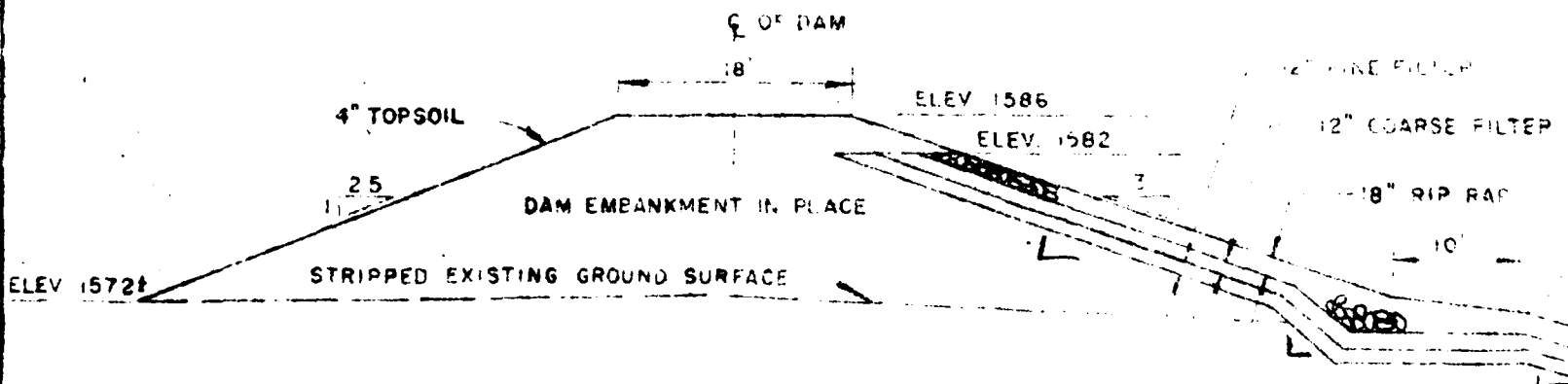


DATUM ELEV. 1570

### SECTION AT STA. 1+23

SCALE 1" = 10'

Q OF DAM



DATUM ELEV. 1560

### SECTION AT STA. 1+87

SCALE 1" = 10'

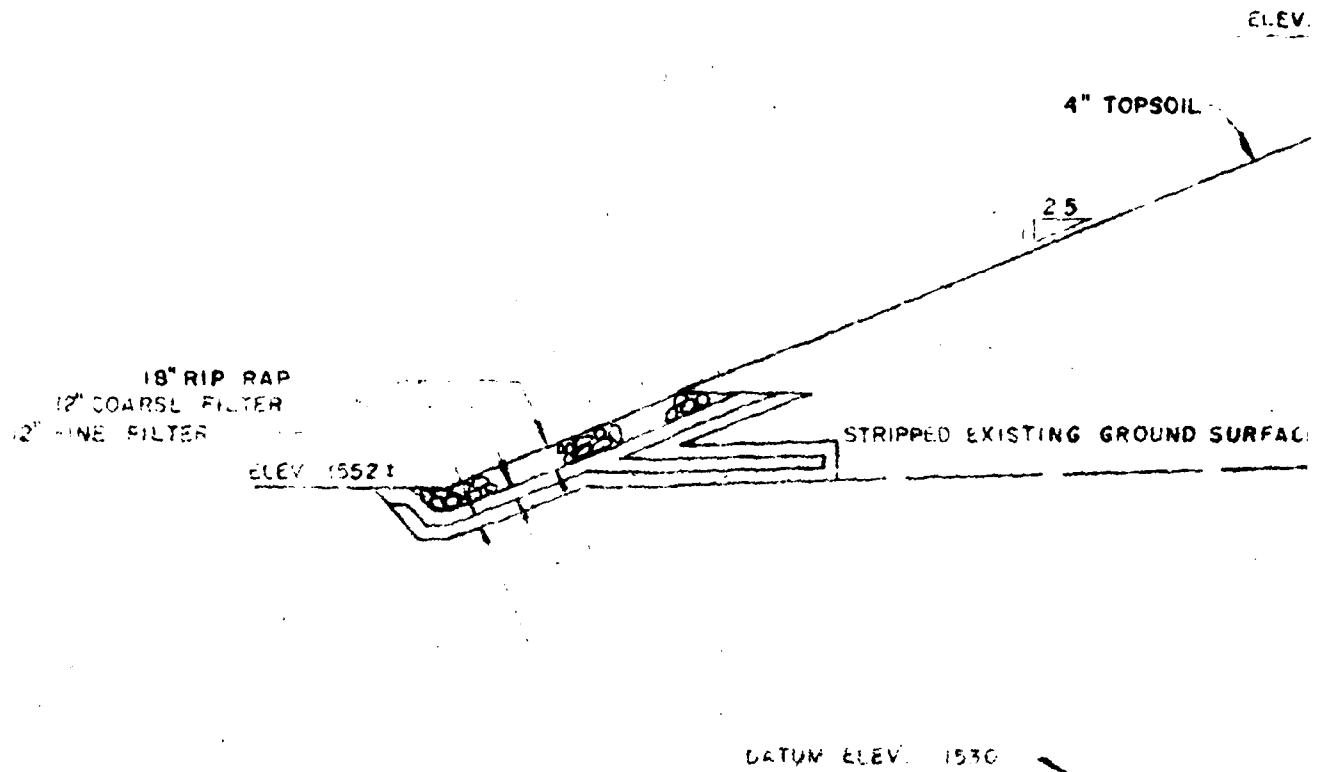
4" TOPSOIL

18'

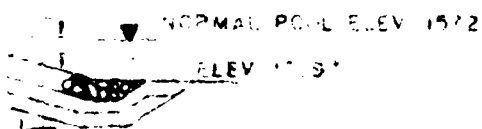
ELEV 1586

DAM EMBANKMENT IN PLACE

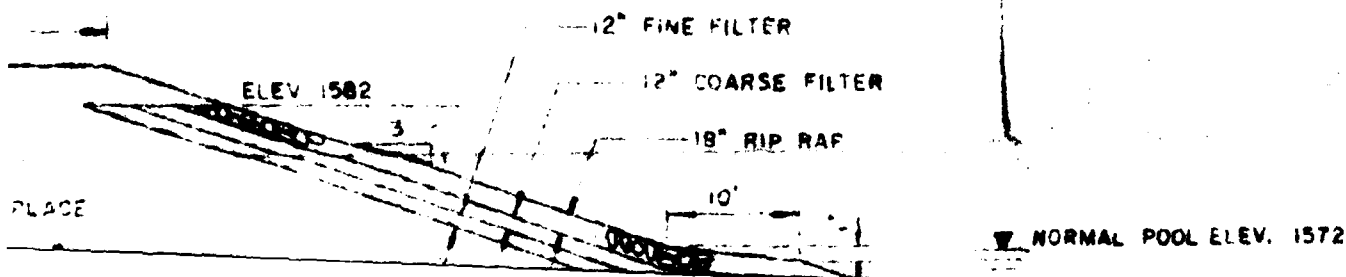
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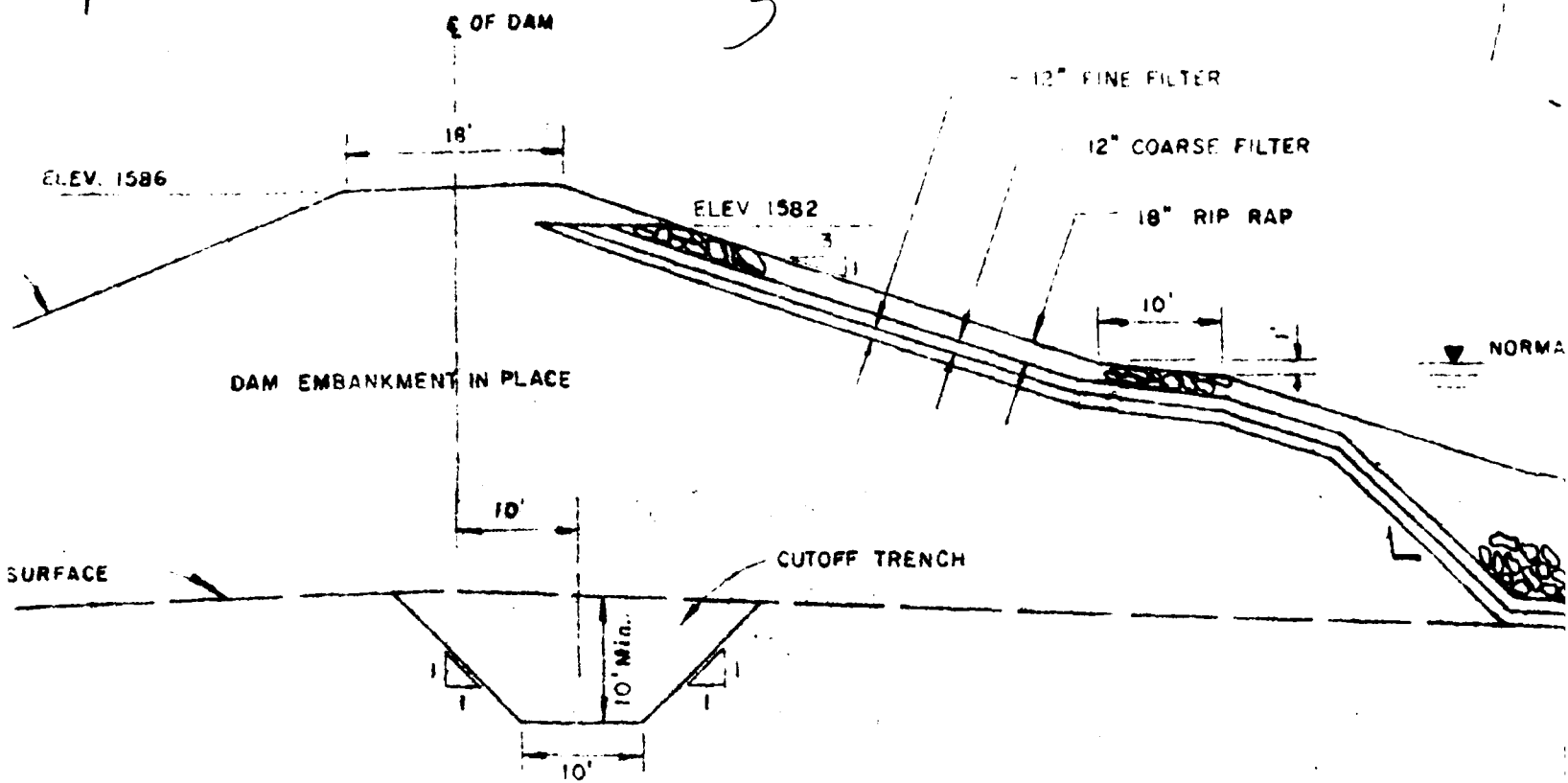


EP



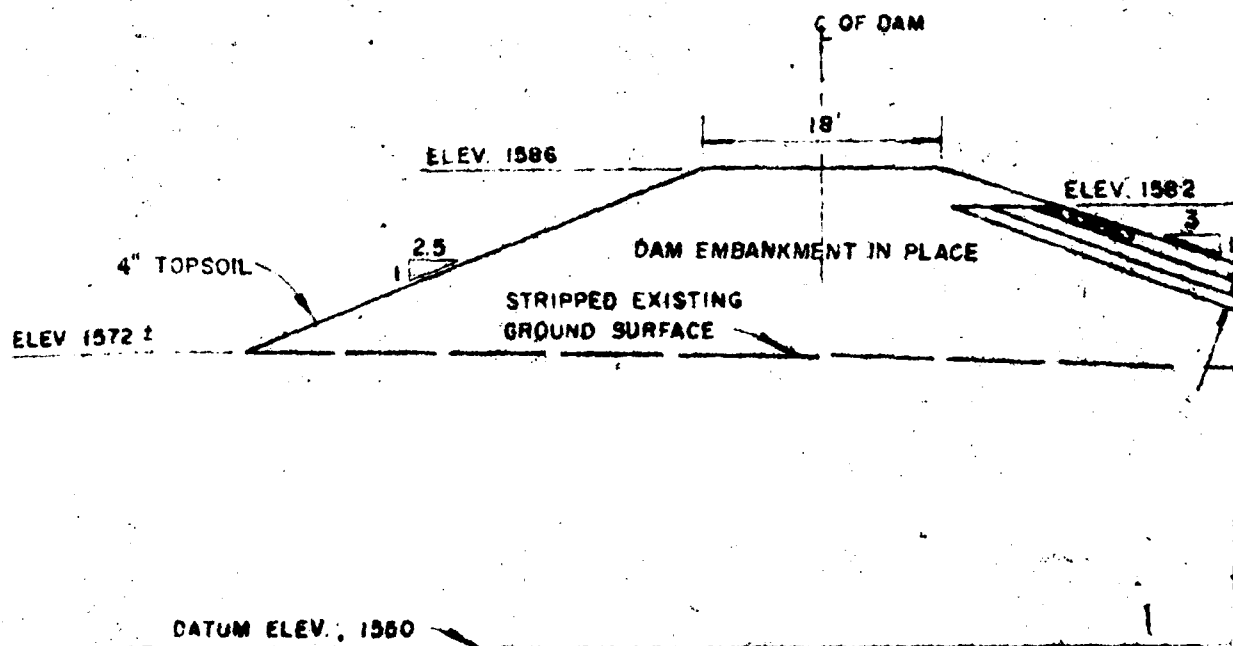
OF DAM





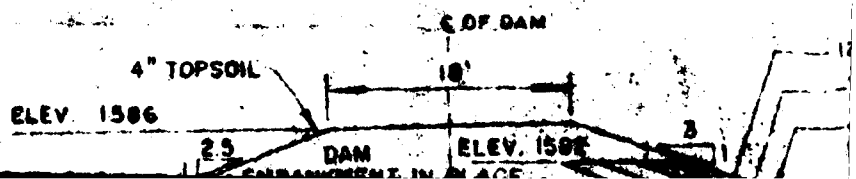
## SECTION AT STA. 3+33

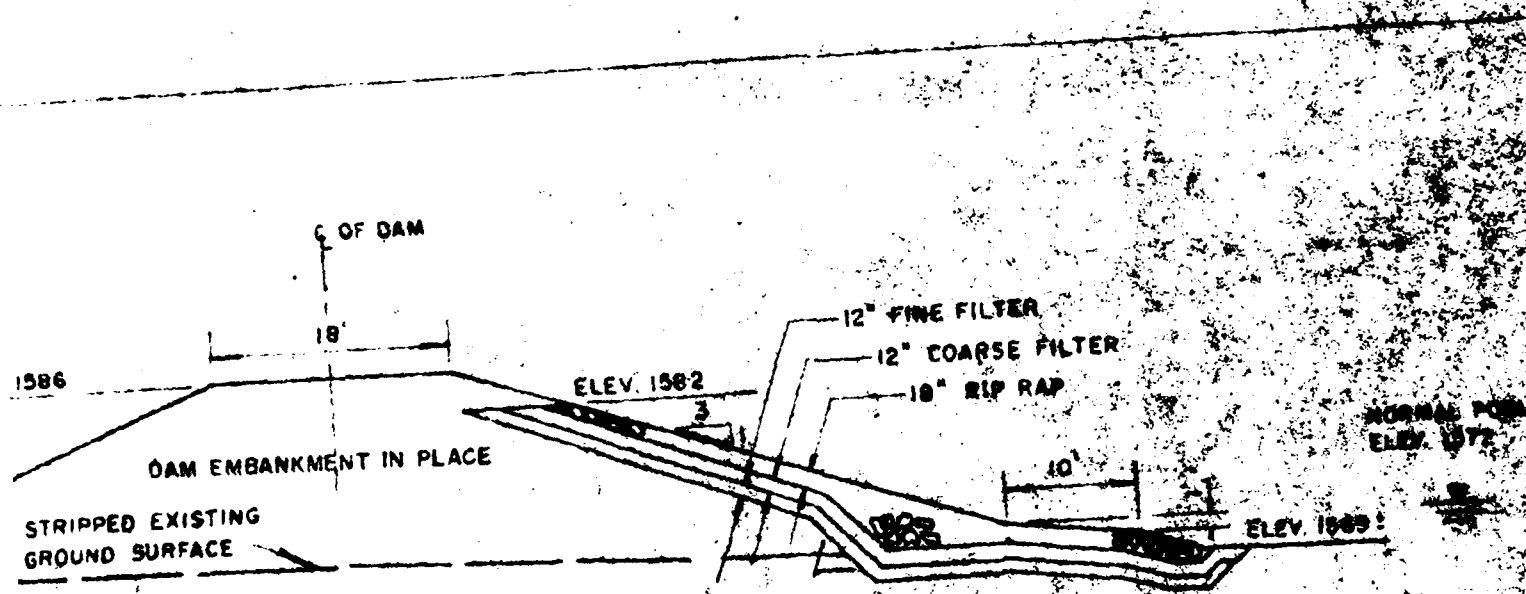
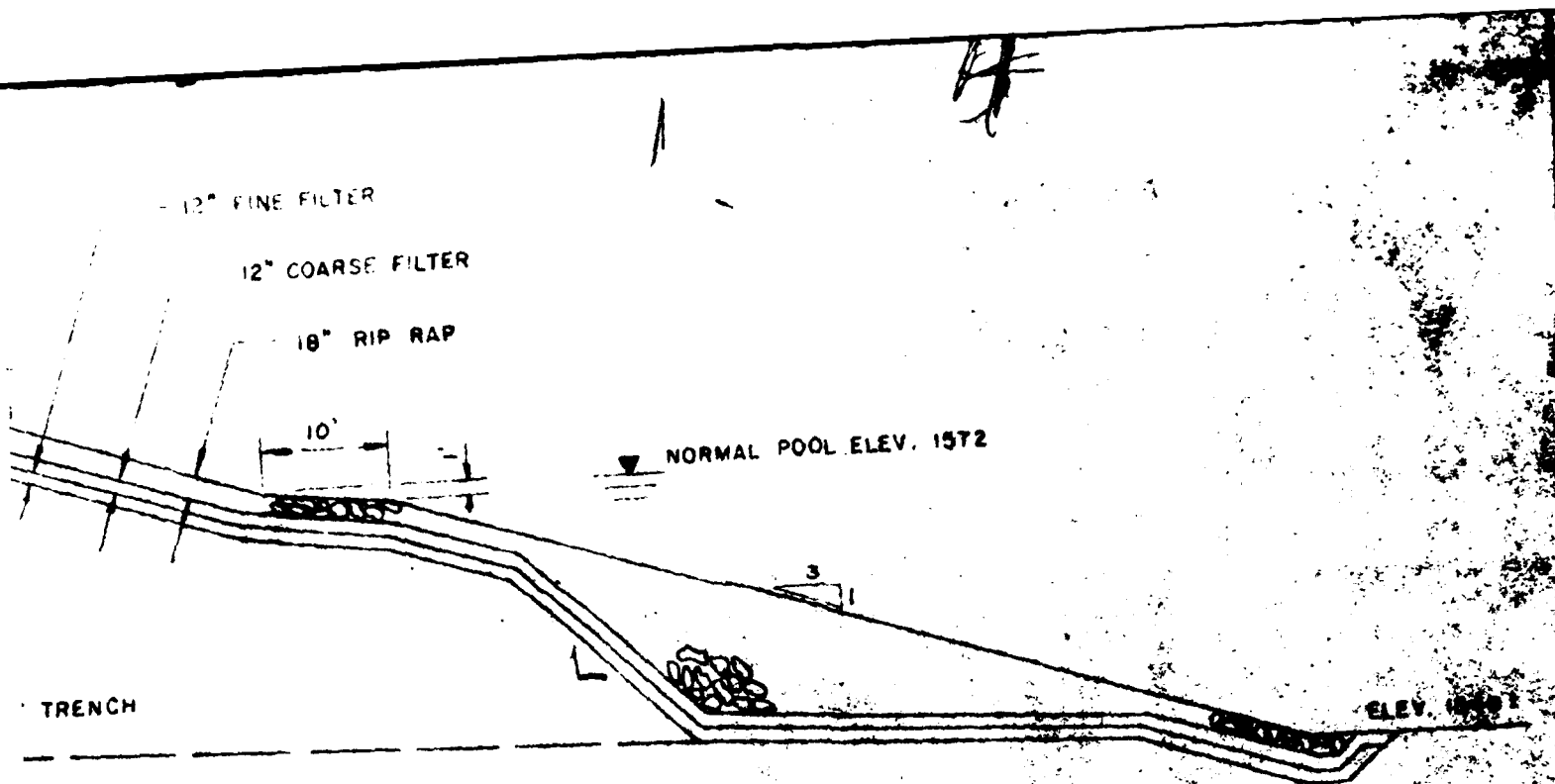
SCALE: 1" = 10'



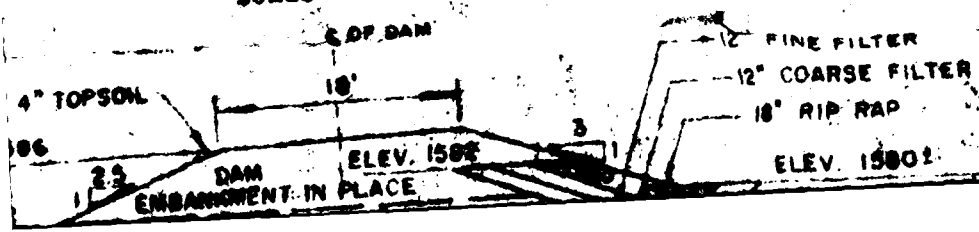
## SECTION AT STA. 3+72

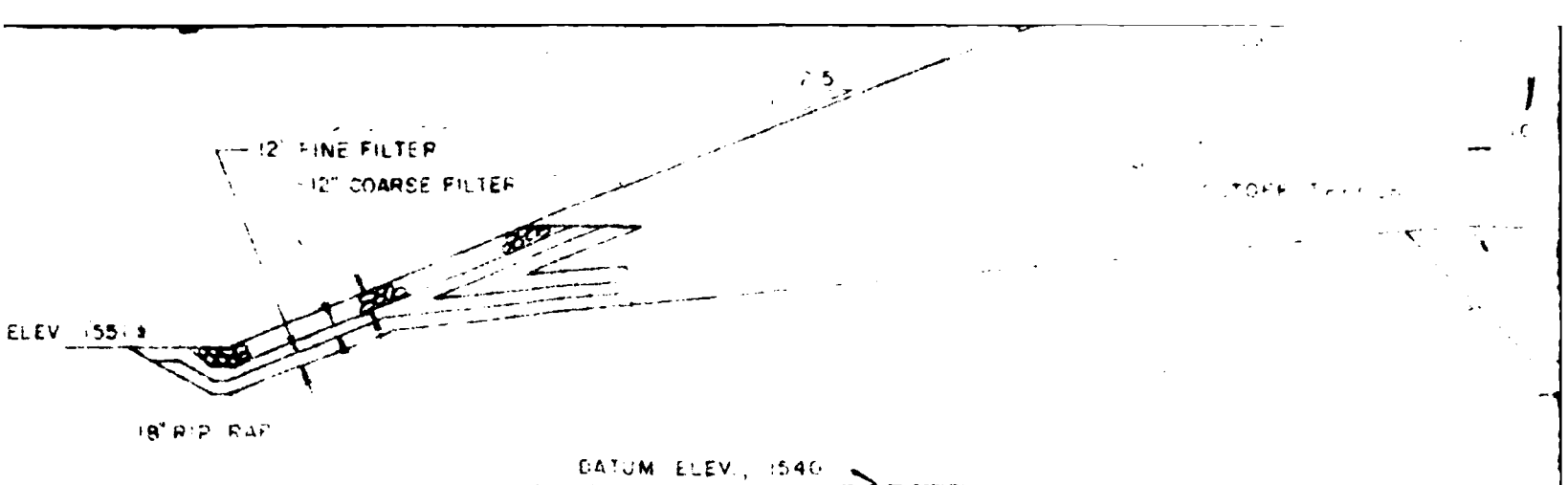
SCALE: 1" = 10'



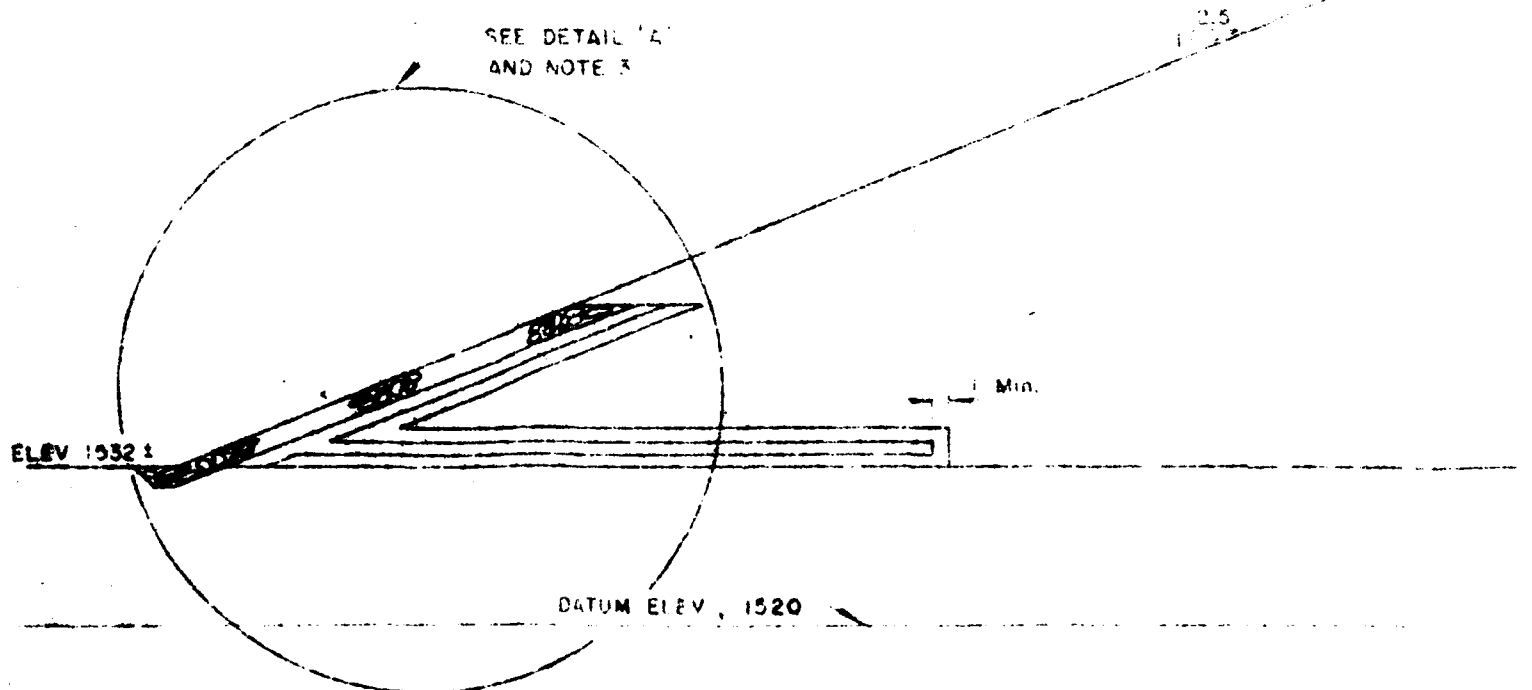


# SECTION AT STA. 3+72





SECTION AT STA

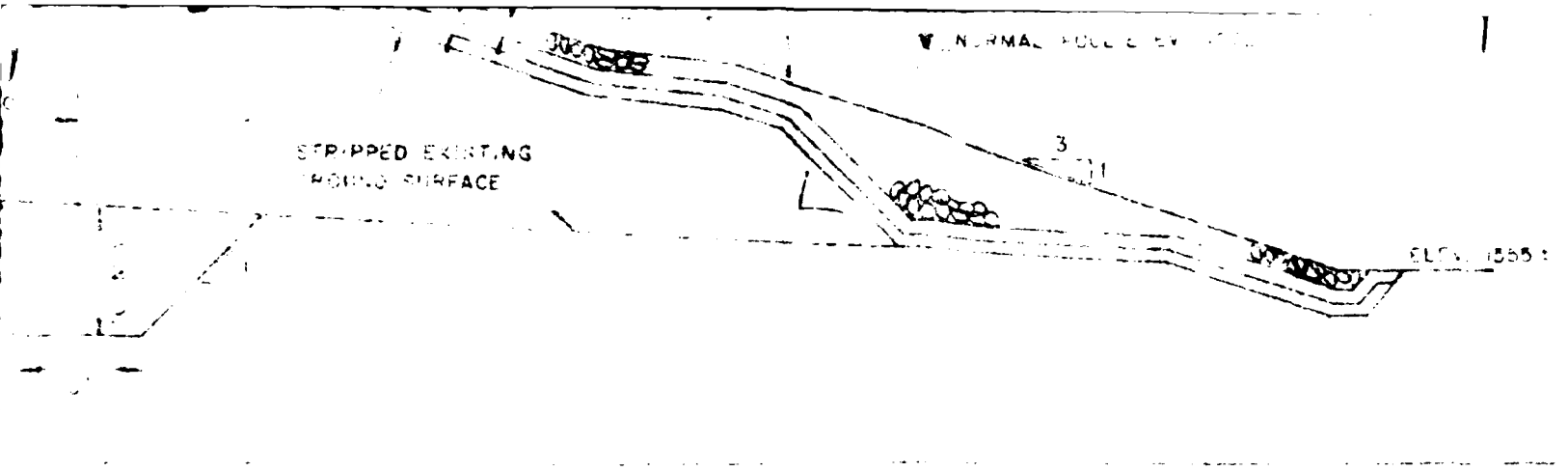


16" RIP RAP  
12" COARSE FILTER  
12" FINE FILTER

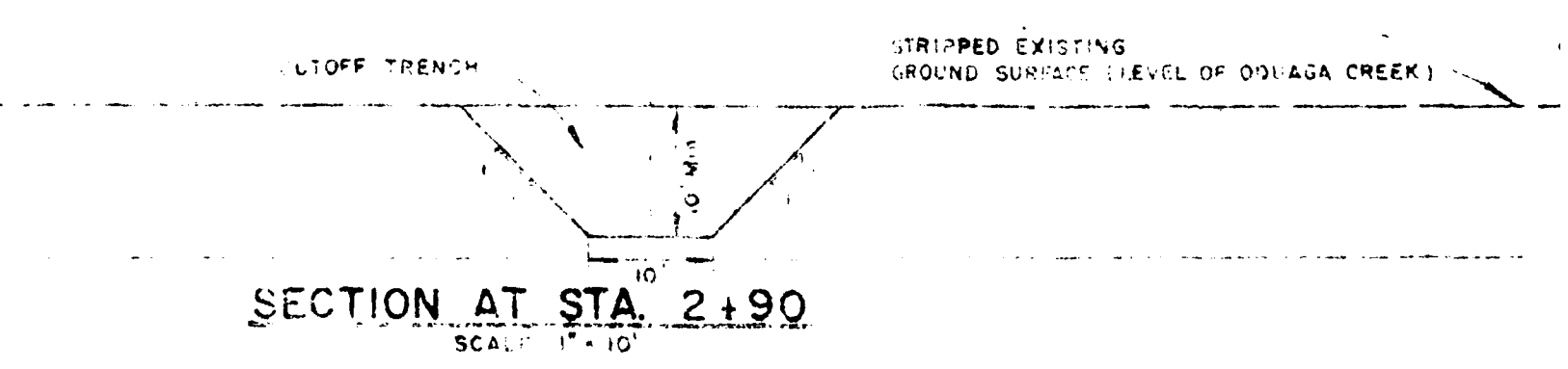
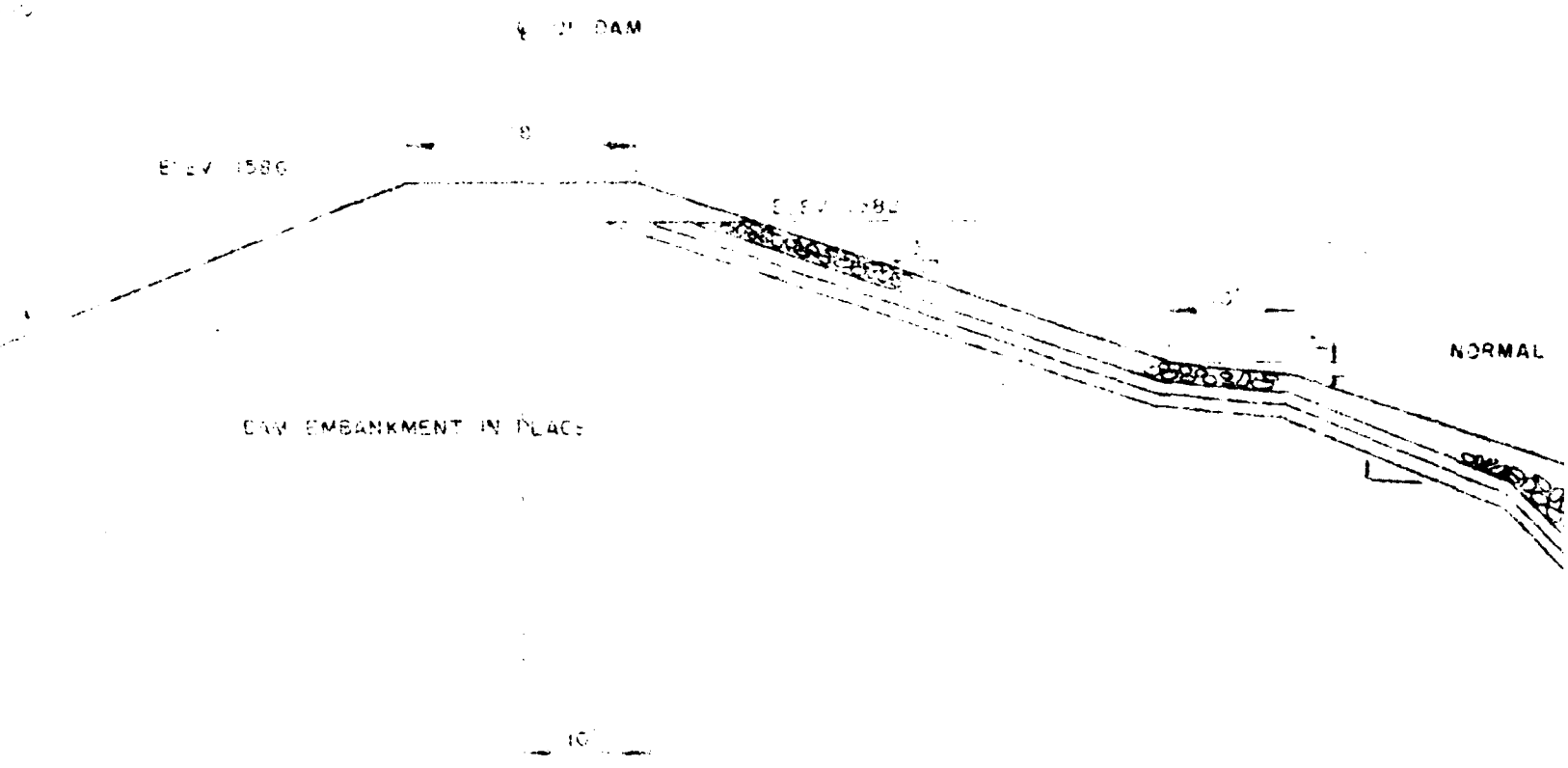
2.5

VARIES

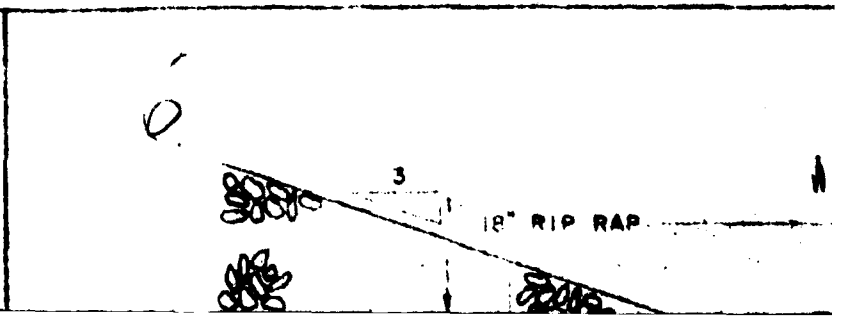
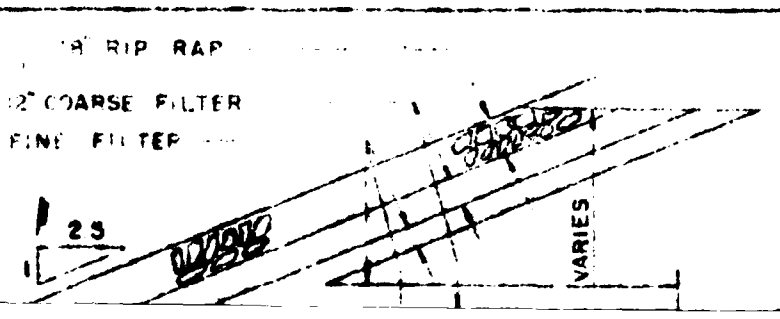
5



STA. 2+40



SECTION AT STA. 2+90  
SCALE 1" = 10'



ELEV 1580 25 DAM ELEV 1582 3 18  
 EMBANKMENT IN PLACE  
 STRIPPED EXISTING GROUND SURFACE

DATUM ELEV. 1570

# SECTION AT STA. 3+97

SCALE 1" = 10'

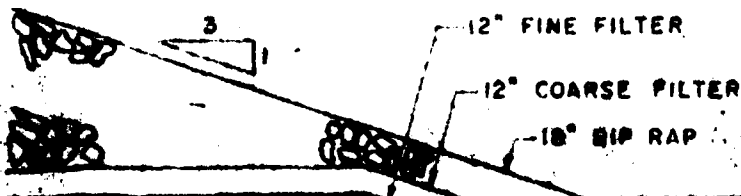
GENERAL

- 1) THE SECTIONS SHOWN WERE TAKEN FROM THE BLOT OFFICE OF GENERAL STAFF DATED NOVEMBER 4, 1918
- 2) THE CUT-OFF TRENCH FINAL DEPTH SHALL BE DETERMINED DURING CONSTRUCTION
- 3) THE ACTUAL METHOD OF TO BE USED AT EACH SECTION THE FIELD USING DATA ON THE FOUNDATION OF SECTION.
- 4) SPREAD TOPSOIL 4" THIN EMBANKMENT IN PLACE

POOL ELEV 1572

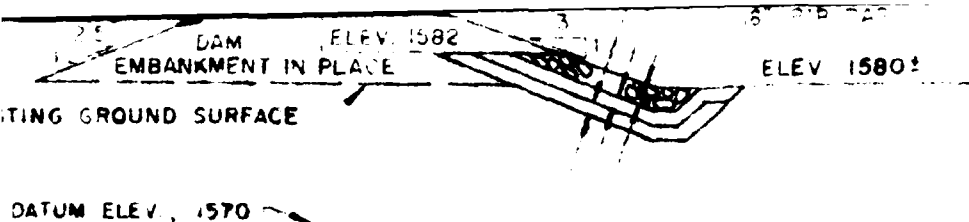
SEE DETAIL 'B' AND NOTE 3

ACTUAL GROUND SURFACE  
 PROPOSED FILTERS  
 IS QUITE VARIABLE  
 EXISTING CULVERT



STATE OF NEW YORK  
 DEPARTMENT OF TRANSPORTATION  
 BUREAU OF SOILS

TYPICAL EMBANKMENT

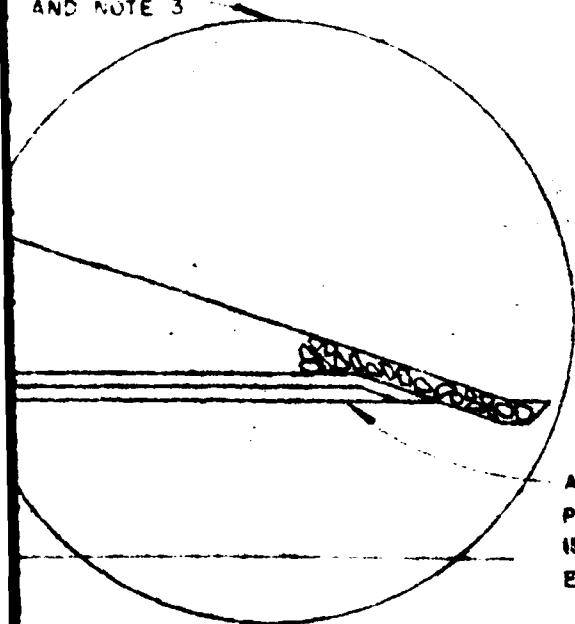


**SECTION AT STA. 3+97**  
SCALE 1" = 10'

**GENERAL NOTES**

- 1) THE SECTIONS SHOWN ARE BASED ON GROUND SURFACES TAKEN FROM THE SLOT PLAN PREPARED BY THE N.Y.S. OFFICE OF GENERAL SERVICES DESIGN AND CONSTRUCTION DATED NOVEMBER 4, 1971 AND NUMBERED 72/5005.
- 2) THE CUT-OFF TRENCH DEPTH SHOWN IS A MINIMUM. THE FINAL DEPTH SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER DURING CONSTRUCTION.
- 3) THE ACTUAL METHOD OF TOR AND REEL FILTER CONSTRUCTION TO BE USED AT EACH SECTION IS TO BE DETERMINED IN THE FIELD USING DETAILS A AND B AS GUIDE AND BASED ON THE FOUNDATION CONDITIONS ENCOUNTERED BY THE SECTION.
- 4) SPREAD TOPSOIL 4" THICK AND SEED OVER ALL EXPOSED DAM EMBANKMENT IN PLACE.

SEE DETAIL 'B'  
AND NOTE 3



ACTUAL GROUND SURFACE UNDER PROPOSED FILTERS IN THIS AREA IS QUITE VARIABLE DUE TO EXISTING CULVERT.

- 7
- 1" FINE FILTER
- 2" COARSE FILTER
- 18" RIP RAP

STATE OF NEW YORK	
EXECUTIVE DEPARTMENT	
PARKS & RECREATION	
ALEXANDER ALDRICH	COMMISSIONER
CENTRAL NEW YORK STATE	
PARKS COMMISSION	
JAMESVILLE	NEW YORK
OQUAGA CREEK STATE PARK	
DAM & LAKE DEVELOPMENT	
GENERAL ENGINEERING	
EMBANKMENT SECTIONS	
& DETAILS FOR DAM	
3	
STATE OF NEW YORK - EXECUTIVE DEPARTMENT	
OFFICE OF GENERAL SERVICES	
DESIGN AND CONSTRUCTION	
DATE 11/2/74	
BY [signature]	

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF SOIL MECHANICS  
**TYPICAL DAM  
EMBANKMENT SECTIONS**



AD-A087 586

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY P/8 13/13  
NATIONAL DAM SAFETY PROGRAM. OQUAGA CREEK STATE PARK DAM (INVEN--ETC(U)  
JUL 80 G KOCH DACW51-79-C-0001

UNCLASSIFIED

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ELEV 1586

ELEV 1582

NORMAL P

DAW EMBANKMENT IN PLACE

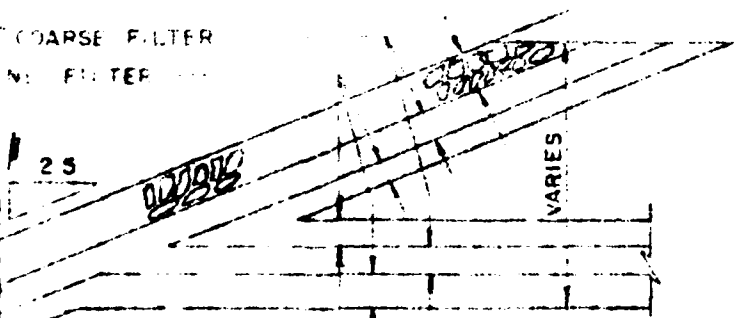
CUTOFF TRENCH

STRIPPED EXISTING  
GROUND SURFACE (LEVEL OF OQUAGA CREEK)

SECTION AT STA. 2+90

SCALE 1" = 10'

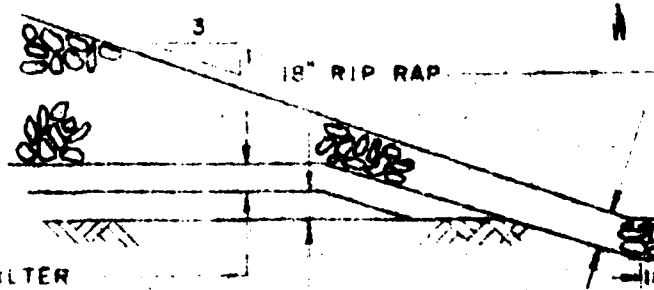
18" RIP RAP  
COARSE FILTER  
FINE FILTER



FOUNDATION

6

12" COARSE FILTER  
12" FINE FILTER



BEDROCK FOUNDATION

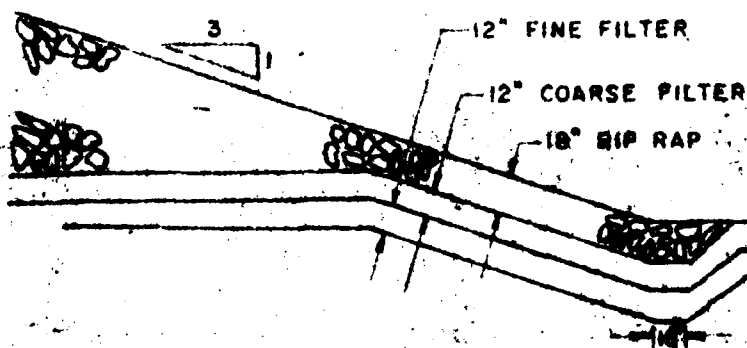
10

- 1) THE SECTIONS SHOWN TAKEN FROM THE SLOPE OFFICE OF GENERAL S. DATED NOVEMBER 4, 1910
- 2) THE CUT-OFF TUNNEL FINAL DEPTH SHALL BE ENOUGH DURING CON
- 3) THE ACTUAL METHOD OF TO BE USED AT EACH THE FIELD USING DATA ON THE FOUNDATION OF SECTION.
- 4) SPREAD TOPSOIL 4" THICK EMBANKMENT IN PLACE

L POOL ELEV 1572

SEE DETAIL 'B'  
AND NOTE 3

ACTUAL GROUND SURFACE  
PROPOSED FILTERS  
IS QUITE VARIABLE  
EXISTING CULVERT



SOIL FOUNDATION

**DETAIL B**  
SCALE 1" = 5'

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF SOIL MECHANICS

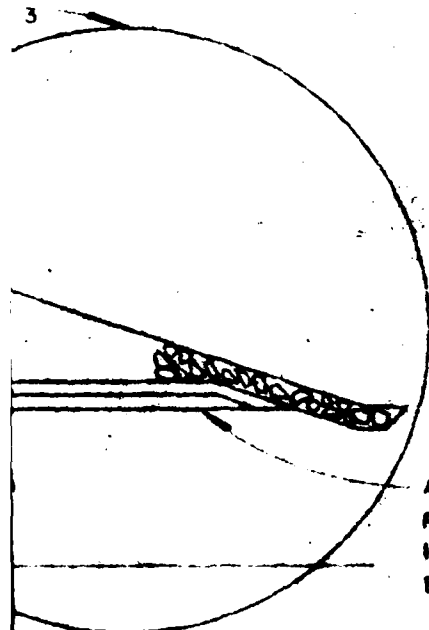
**TYPICAL EMBANKMENT SECTION**  
R.L. 210000 -

APPROVED FOR THE ENGINEER  
[Signature]

PREPARED BY: [Signature]  
CHECKED BY: [Signature]

- 1) THE SECTIONS SHOWN ARE BASED ON GROUND SURFACES TAKEN FROM THE SLOT PLAN PREPARED BY THE N.Y.S. OFFICE OF GENERAL SERVICES DESIGN AND CONSTRUCTION DATED NOVEMBER 4, 1971 AND NUMBER 72-003.
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IL 'B'  
3



ACTUAL GROUND SURFACE UNDER PROPOSED FILTERS IN THIS AREA IS QUITE VARIABLE DUE TO EXISTING CULVERT.

STATE OF NEW YORK  
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QUAGA CREEK STATE PARK  
DAM & LAKE DEVELOPMENT

GENERAL ENGINEERING

EMBANKMENT SECTIONS  
& DETAILS FOR DAM

8

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION  
BUREAU OF SOIL MECHANICS

TYPICAL DAM  
EMBANKMENT SECTIONS  
R.L.N. 81000-701

APPROVED BY: [Signature]  
DATE: 11/2/74

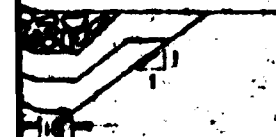
PREPARED BY: [Signature]  
DRAWN BY: [Signature]  
CHECKED BY: [Signature]

STATE OF NEW YORK - EXECUTIVE DEPARTMENT  
OFFICE OF GENERAL SERVICES  
DESIGN AND CONSTRUCTION

DATE	FILE	APPROVED
11/2/74	AS SHOWN	[Signature]
DESIGNED BY	CHECKED BY	DATE
[Signature]	[Signature]	11/2/74

TER

FILTER  
RAP



END

DATE  
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